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DISEASES

of the

RECTUM, ANUS, AND COLON

Including the

ILEOCOLIC ANGLE, APPENDIX, COLON,
SIGMOID FLEXURE, RECTUM, ANUS,
BUTTOCKS, AND SACROCOCCYGEAL REGION

BY

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WITH 1128 ILLUSTRATIONS ON 1085
FIGURES AND 10 INSETS IN COLORS

VOLUME III

PHILADELPHIA AND LONDON

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CONTENTS OF VOLUME III

CHAPTER LXIX

PAGE

Bacillary Colitis—B. Dysentery—Asylum Dysentery..... 1

CHAPTER LXX

Protozoal Colitis—Dysentery..... 14

CHAPTER LXXI

Parasitic Diseases, Helminthic Colitis..... 19

CHAPTER LXXII

Hemorrhagic Colitis..... 39

CHAPTER LXXIII

Tuberculosis of the Small Intestine, Colon, and Sigmoid Flexure 43

CHAPTER LXXIV

Venereal Diseases of the Colon and Sigmoid Flexure..... 74

CHAPTER LXXV

Gastro-intestinal Toxic Disturbances—Ptomain Poisoning and
Chemical Poisoning..... 82

CHAPTER LXXVI

Rectocolonic Pigmentation..... 86

CHAPTER LXXVII

Organic Diseases..... 89

CHAPTER LXXVIII

Sundry Diseases..... 99

CHAPTER LXXIX

Miscellaneous Contagious, Infectious, and Tropical Intestinal
Diseases..... 109

CHAPTER LXXX

Focal Infection of the Colon, Sigmoid Flexure, and Rectum, and Its Relation to Systemic Diseases—Endocarditis, Arthritis, Nephritis, etc.	PAGE 117
--	-------------

CHAPTER LXXXI

Hemorrhage of the Stomach, Small Intestine, Colon, and Sig- moid Flexure.	123
---	-----

CHAPTER LXXXII

Rectocolonic Neuroses.	133
-----------------------------	-----

CHAPTER LXXXIII

Appendicitis.	141
--------------------	-----

CHAPTER LXXXIV

Pericolitis and Perisigmoiditis.	150
---------------------------------------	-----

CHAPTER LXXXV

Diverticula—Diverticulitis—Diverticulosis, and Peridivertic- ulitis of the Small Intestine, Cecum, Colon, and Sigmoid Flexure.	155
---	-----

CHAPTER LXXXVI

Constipation, Obstipation, Intestinal Stasis, and Auto-intoxi- cation.	173
--	-----

CHAPTER LXXXVII

Chronic Medical—Atonic—Constipation.	179
---	-----

CHAPTER LXXXVIII

Obstipation—Intestinal Obstruction and Intestinal Stasis— Auto-intoxication.	219
--	-----

CHAPTER LXXXIX

Congenital—Idiopathic—Dilatation of the Colon and Sigmoid Flexure (Hirschsprung's Disease, Colonic Hypertrophy, Congenital Megacolon).	292
---	-----

CHAPTER XC

Fecal Impaction—Coprostasis.	304
-----------------------------------	-----

CHAPTER XCI

Benign Growths and Cysts of the Colon and Sigmoid Flexure, Including Mesenteric Embolism and Thrombosis.....	PAGE 317
---	-------------

CHAPTER XCII

Malignant Growths of the Small Intestine, Colon, and Sigmoid Flexure (Carcinoma, Sarcoma).....	330
---	-----

CHAPTER XCIII

Cecostomy, Ileocecostomy—Gant's—Appendicostomy, Appen- dicocecostomy, Appendico-enterostomy.....	365
---	-----

CHAPTER XCIV

Enterostomy—Ileostomy—Colostomy—Colotomy—Sigmoid- ostomy.....	394
--	-----

CHAPTER XCV

Intestinal Exclusion—Short-circuiting.....	422
--	-----

CHAPTER XCVI

Closure of Artificial Anus—Colostomy Opening—and Fecal Fistula.....	433
--	-----

CHAPTER XCVII

Colonic, Sigmoidal, Rectal, and Anal Diseases of Infancy and Childhood.....	441
--	-----

Index to Volumes I, II, III.....	465
----------------------------------	-----

DISEASES OF THE ANUS, RECTUM, AND COLON

Chapter LXIX

Bacillary Colitis—Bacillary Dysentery, Asylum Dysentery

BACILLARY colitis was first described by Chantness and Widall, but it remained for Shiga to discover the organism usually responsible for it.

This type of colitis, which is frequently encountered in *epidemic* form in the tropics, Japan, China, and India, is occasionally met with in Europe and the United States, usually in asylums, penitentiaries, barracks, working men's camps, and among children during the summer months.

ETIOPATHOLOGY

Bacillary colitis is essentially an *acute* disease, the patient dies or recovers quickly, and in these cases inflammation is intense and *toxemia* profound, but destruction of mucosa is less than in amebic colitis, there being in some instances but minor structural changes. When extensive lesions are present there is mixed infection participated in by other micro-organisms.

In contradistinction to amebic, bacillary colitis often runs its course in a few days or weeks, and dangerous manifestations, minor and serious lesions develop early, and in fatal cases death often ensues from toxins before lesions are discoverable in the mucosa.

The infective process may be of the *ascending* or *descending* type and usually involves the large intestine, being particularly destructive in the sigmoid flexure and rectum, but bacillary colitis and ileocolitis are occasionally encountered.

Mortality is highest *early* in bacillary and *late* in amebic colitis, due to *toxemia* in the former and *exhaustion* from ulceration in the latter, and dysenteric bacilli attack the epithelium and *gradually* penetrate the mucosa, while Entamoebæ histolytica *immediately* perforate the mucous membrane and enter the submucosa to become active, which accounts for *superficial* in the *former* and *devastating* lesions in the *latter*.

Extensive deep ulcers (Fig. 717) and sloughs (Fig. 718) are sometimes encountered in chronic mixed infection cases accompanied by marked infiltration and impairment to the circulation. When infection is less severe mucosa is congested or marked by

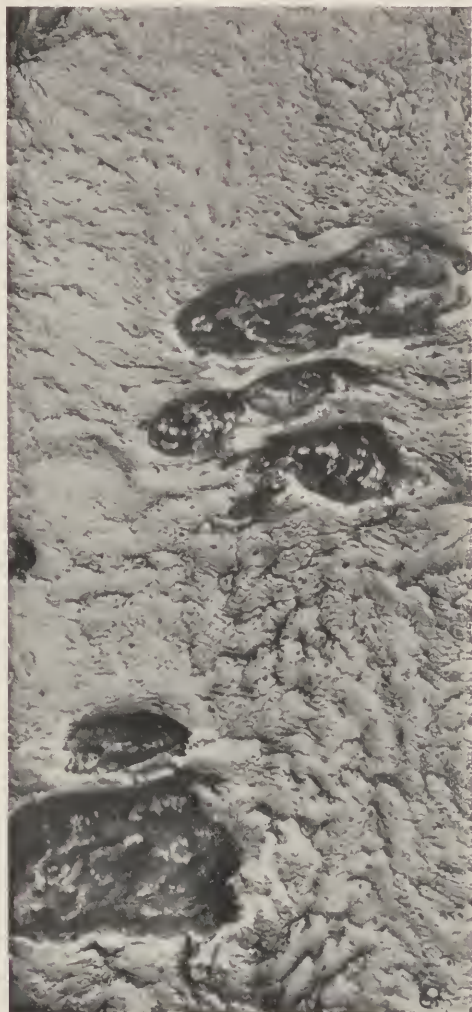


Fig. 717.—Chronic bacillary (Shiga) colitis—dysentery. (Army Medical Museum.)

superficial erosions and the submucosa is edematous and thickened but seldom undergoes necrosis.

Based on structural changes occurring in the bowel the author classifies bacillary colitis into *catarrhal*, *ulcerative*, and

pseudomembranous types. In the *catarrhal* form mucosa is highly congested, thickened, and often edematous, and may be marked by superficial erosions, while in *ulcerative* bacillary (Fig. 717) colitic lesions occur immediately when infection is virulent or later in



Fig. 718.—Bacillary colitis (bacillary dysentery) with pseudomembranous (diphtheric) sloughing of colon.

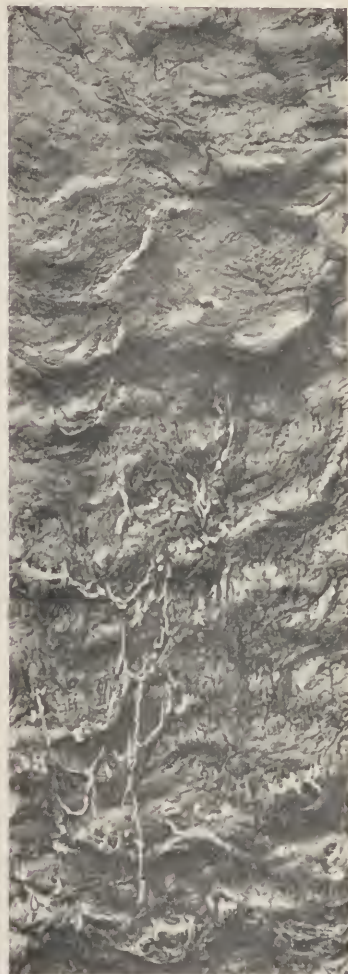


Fig. 719.—Sloughing pseudomembranous (diphtheric) dysentery of rectum.

(Army and Navy Museum.)

milder cases become chronic and other intestinal micro-organisms participate in the infective process. When there is mixed infection ulcers may be numerous, large or small, variable in shape, and deep or shallow, but their edges are rounded (Fig. 717) and the

mucosa is seldom undermined by ulceration or fistulæ as in amebic colitis, where the destructive process is centered in the submucosa (Fig. 717). Occasionally there is a *dual* infection and both *dysenteric bacilli* and *Entamæbæ histolytica* are encountered in the stools.

Pseudodiphtheric membranes (Fig. 718) may involve but usually form upon the mucosa, and are removable with swab or curet when the undermined mucous membrane appears congested, swollen, and degeneration of follicles or possibly necrosis of interglandular structures are observed in case blood-vessels are strangulated. Such membranes are voided in the form of strips or casts of the bowel and have been mistaken for actual sloughing of intestinal tunics in deplorable cases of both bacillary and entamebic colitis, a condition usually followed by the formation of *single* or *multiple strictures*.

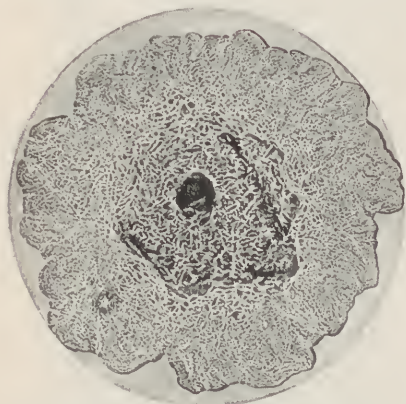


Fig. 720.—*Bacillus dysenteriae*. Colon on gelatin four days; $\times 20$. (Doerr.)

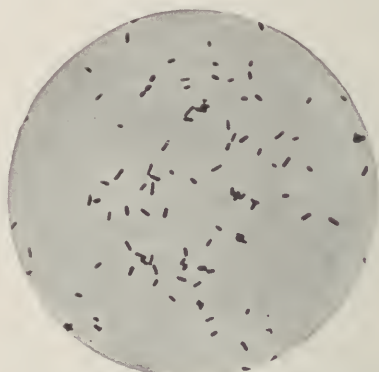


Fig. 721.—*Bacillus dysenteriae* from agar culture. Fuchsin stain. Zeltnow preparation. (Kolle and Wassermann.)

Liver abscess common in amebic, seldom if ever complicates bacillary infection; cardiac and circulatory disturbances, phlebitis, nephritis and cholelithiasis, and bronchial pneumonia are frequently associated with the condition.

The *etiology* of bacillary colitis is variable, as shown by epidemics of the disease studied by different observers wherein infection was produced by *dysenteric bacilli* of the *Shiga* (Fig. 720), *Kruse*, *Flexner*, *Park*, *Duval*, *Hiss*, *Russell*, *Strong*, or other types, which had gained access to the body through drinking contaminated water, eating infected food, or being carried to the mouth or anus with the fingers, dishes, colon tubes, or instruments.

Colitis induced by the *Shiga* or *Kruse* organism is more viru-

lent than infection resulting from other dysenteric bacilli—Flexner and related types—and to indicate the clinical significance of this the author designates the former bacillary *dysenteric* and the latter bacillary *dysenteroid* colitis.

The *classification* of bacilli known to have caused colitis or dysentery is not easy because they differ in their mannite fermenting, chemical, agglutinating, and other characteristics (see differentiating table, p. 7), and new organisms, believed to have a casual relation to the disease, are being added to the list.

The *Bacillus pyocyaneus*, a small *micrococcus*, and different parasites are sometimes associated with *B. dysenteric*, colon, proteus, and *aërogenes* bacilli, streptococci, and staphylococci.

SYMPTOMS

Manifestations are distressing and often *serious* from the beginning when infection is due to Shiga's, but less so when caused by Flexner's, Park's, Duval's, or other less virulent bacilli; the disease is *subacute* or *chronic* and symptoms are less troublesome, but resembles those of amebic colitis.

Catarrhal bacillary colitis, which is not common, begins with abdominal soreness or colicky pains and diarrhea, when the patient has from four to six daily semisolid, mushy, blood-tinted stools containing considerable bile and mucus. Later evacuations become more frequent and fluid, containing blood, and griping pains, tenesmus, and burning sensations in the rectum are troublesome; there is anorexia and more or less indigestion, manifestations that may subside, modify, or increase in severity, depending on lessening or extension of the infection.

In the majority of cases, however, bacillary colitis is serious from the beginning, the onset is sudden, local and constitutional symptoms are distressing, poisoning from absorbed toxins is profound, and the patient becomes dangerously ill within forty-eight hours, suffering from *chilly sensations*, *intermittent high temperature*, *erratic fast pulse*, *thirst*, *hoarse voice*, *glazed red tongue*, *cold dry skin*, *aching body*, *prostration*, *restlessness*, *headache*, *severe cramps*, *disseminated abdominal pain*, *colonic tenderness on pressure*, *nausea*, *vomiting*, *delirium*, *congestion of the liver*, and *exhausting diarrhea* characterized by small, frequent (ten to fifty daily) fluid passages, which in the beginning are feculent, then seromucous, and finally composed almost entirely of mucus, tissue debris, and blood, which shows bright red if fresh or as coffee-ground-like stools when long retained.

When progress of the disease is not promptly arrested the

patient becomes delirious, comatose (5 to 20 per cent. of cases), and dies from toxemia, exhaustion, or sepsis.

In favorable cases symptoms subside and the patient recovers within a month, or infection becomes chronic, causing diarrhea, blood and mucus in stools, and abdominal pain that persist in a modified or severe form proportionate to the number and size of the lesions.

In extensive *ulcerative bacillary colitis* (Fig. 717) and when the bowel is seriously involved by *diphtheric* or *gangrenous sloughs* (Fig. 718), as a result of mixed infection, the patient suffers from a sallow or muddy complexion, chilly sensations, septic temperature, leukocytosis, hemorrhages, abundant mucopurulent discharge, numerous offensive stools, and the mucosa is undermined from abscesses and fistulæ; manifestations and tissue changes that in neglected cases eventually cause death from exhaustion or sepsis.

Complications and *sequelæ* less frequently accompany and follow bacillary than amebic colitis. Perforations and peritonitis are rare, since the destructive process is superficial and confined chiefly to the mucosa, but strictures form occasionally when the mucous membrane has been denuded over large areas by ulcers or sloughing.

Inflammation of joints, bronchopneumonia, pleurisy, albuminuria, valvular disturbances, meningitis, paraplegia, neuritis, splenic enlargement, cholelithiasis, impairment of the arterial tunics, enlargement of the mesenteric lymph-nodes, intestinal ptosis, adhesions, angulations, appendicitis, pericolitis, sigmoiditis, proctitis, hemorrhage, adenomata, enlarged anal papillæ, fissures, ischio-rectal abscesses, fistulæ, hemorrhoids, and erosions of the mucosa and gluteal skin sometimes complicate bacillary colitis.

DIAGNOSIS

While a study of symptoms is helpful and must not be neglected, too much importance should not be placed on them, since a positive diagnosis of bacillary colitis can only be made from *microscopic examination of fresh feces* and finding and cultivation of Shiga's, Flexner's, Hiss', Duval's, or other type of *bacilli* known to have caused this form of colitis. Occasionally in mixed infection cases parasites of more than one variety of dysenteric bacilli are detected.

Bacillary differs from *amebic* colitis in that (a) it occurs in epidemic form more frequently among inmates of asylums, prisons, barracks, railroad camps, etc.; (b) has a more sudden onset; (c) is accompanied by profound toxemia; (d) occurs more frequently in

BACILLARY COLITIS—ASYLUM DYSENTERY

Micro-organism.	Character.	Motility.	Flagella.	Growth of nutrient agar.	Gelatin stab.	Peptone and salt.	Neutral red shake.	Litmus milk.	Sterile potato.	Agglutination with dysenteric serum.
<i>Shiga's Bacillus dysenteriae</i> (I).	Short rod with rounded ends. No spores. Length, 1 to 3 μ .	Motile in recent cultures from stools. Gradually loses motility in subcultures.	Two to six. Mostly terminal. Rather short and thick.	Semi-opaque. Resemble the growth of <i>Bacillus typhosus</i> , but are more transparent.	Similar to <i>Bacillus typhosus</i> , but film which spreads out from puncture usually absent.	Faint haziness which rapidly clears. No indol.	No appreciable discharge of color.	Becomes feebly acid. After four days incubation acidity has been estimated as equal to 6 per cent. decinormal alkaline solution. No clot.	Transparent or whitish growth, which becomes brownish red or dirty gray, with discoloration of potato at edge in a few days.	Usually only agglutinates with serum from animal immunized by special strain of <i>Bacillus dysenteriae</i> .
<i>Shiga's bacillus</i> (II).	Ibid.	Ibid.	Ibid.	Has a characteristic odor, called by the Germans and then only "Sperme-ruch."	Growth not seen till forty-eight hours, and then only slight white growth.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<i>Vaillard's bacillus</i> .	Shorter than <i>Shiga</i> , otherwise similar.	Ibid.	Numerous, fine, reticulated, very long, and readily seen (Birt).	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<i>Flexner's bacillus</i> .	Similar to <i>Shiga</i> .	Ibid.	Long, thick, and terminal.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<i>Kruse's bacillus</i> .	Ibid.	Ibid.	Usually two terminal.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.	Ibid.
<i>Pseudodysenterial bacillus</i> .	Generally somewhat larger than true dysenteric bacillus.	Ibid.	Variable.	Ibid.	Ibid.	Ibid.	Ibid.	Slightly acid at first. Afterward slightly alkaline.	Ibid.	Very variable.
<i>Bacillus typhosus abdominalis</i> .	Longer than either <i>Bacillus dysenteriae</i> or <i>B. coli</i> . "Oval ends." (Muir and Ritchie.)	Subcultures always very motile.	Eight to twelve.	More opaque than those of <i>Bacillus dysenteriae</i> .	Similar, but surface film usually present.	Ibid.	Ibid.	Slight acidity after some days.	For several days apparently no growth. Later slight pellicle with velvety surface.	Nil.
<i>Paratyphoid bacilli</i> .	Ibid.	Not so motile as <i>Bacillus typhosus</i> , but more so than <i>B. coli</i> .	Variable.	Ibid.	Ibid.	Ibid.	A, Usually no change. B, Sometimes fluorescence.	Paratyphoid A produced acid-like <i>Bacillus typhosus</i> and Paratyphoid B, produced alkali.	Variable.	Nil.
<i>Bacillus coli communis</i> .	Shorter and thicker than <i>Bacillus typhosus</i> .	Motility is not so marked as <i>Bacillus typhosus</i> .	Two to six.	More opaque than <i>Bacillus typhosus</i> .	Whiter, thicker, more opaque, and showing gas-bubbles.	Indol production marked.	Canary yellow color produced and gas-bubbles.	Marked acid and clot.	In forty-eight hours distinct brownish film, which rapidly spreads and becomes thicker.	Nil.

children; (*e*) is of shorter duration; (*f*) most dangerous during the first week or ten days; (*g*) very often complicated by diphtheric or gangrenous sloughing; (*h*) often associated with arthritis; (*i*) usually involves the superficial mucosa; (*j*) seldom complicated by relapses; (*k*) more quickly subsides; and (*l*) the blood-serum agglutinates with Shiga's, Flexner's, Duval's, and other dysenteric bacilli, while serum of amebiasis does not agglutinate with entamebæ.

The chief *differentiating* characteristics of *dysenteric bacilli* have been conveniently arranged by Manson in the table shown on page 7.

The degree to which the mucosa is inflamed and the number, size, depth, and character of ulcers is ascertained by *digital exploration* and inspection of the sigmoid flexure and rectum through a *proctosigmoidoscope*, but in neglected cases one cannot positively differentiate between catarrhal and specific infections by directly examining lesions.

TREATMENT

The **symptomatic** in this is about the same as in other forms of colitis, but the *curative* treatment of bacillary colitis differs in some respects and in a series of cases embraces *prophylactic measures, supportive therapeutics, medication, serotherapy, colonic irrigation*, and surgery in aggravated chronic cases.

Prophylactic Treatment.—This type of colitis, usually occurring in epidemic form, is prevented from spreading by isolating patients, protecting food and water against contamination, prohibiting healthy individuals from using drinking cups, dishes, and toilets used by patients suffering from bacillary colitis.

Supportive Treatment.—Strengthening measures are less often required in bacillary than amebic colitis, because the patient usually dies or recovers quickly. However, in chronic cases complicated by exhaustion, rest in bed during exacerbations, a nourishing non-irritating diet, tonics and agents that will allay nervousness, relieve insomnia, and build up the system are employed to advantage.

Medicinal Treatment.—Since no medical specific has been discovered, medicinal treatment is regarded as *symptomatic* rather than *curative*.

At the onset of acute and beginning of exacerbations in chronic bacillary colitis relief is obtained through the administration of castor oil, ʒj to ij (30.0–60.0); magnesium or sodium sulphate, ʒij to viij (4.0–30.0), or calomel, gr. ij to iij (0.12–0.18), which satisfactorily clear the bowel of feces and irritants of all kinds; catharsis is followed by the administration of ipecac, 45 gr. (3.0),

decreased in dosage daily, gr. v (0.30) until gr. x (0.60) are reached, which is continued nightly until diarrhea, cramps, and bleeding have abated; value of the drug is enhanced during acute attacks by having the patient fast and rest in a dark room until distressing manifestations subside. Nausea and vomiting from ipecac is lessened by a mustard plaster over the stomach and administering the drug in pill form and in smaller doses at longer intervals.

Abdominal pain, cramps, tenesmus, and diarrhea causing exhaustion or collapse are satisfactorily controlled by an opiate pill, gr. $\frac{1}{4}$ (0.015), or laudanum, ℥xx (1.3), alone or in combination with belladonna, gr. $\frac{1}{4}$ (0.015), when enterospasm is distressing.

When fermentation and putrefaction are troublesome, dysenteric manifestations are lessened or controlled by reinforcing above treatment with bismuth subnitrate, subcarbonate or subgallate, thymol, beta-naphthol, salol, or charcoal, 15 gr. (1.0) or more three times daily; agents that minimize bacterial activity and the formation of gas, but whose bactericidal power is not sufficient to destroy Shiga and other bacilli.

Persistent diarrhea not controlled in the above manner is relieved by combining an astringent—gallic acid, tannalbin, tannigen, or guaiacol—in 10-gr. (0.60) doses t. i. d. with one of the above opiates or astringent remedies.

Serum and Vaccine Treatment.—Sera and vaccines, useless in *amebic*, are as necessary in the treatment of bacillary colitis as is antitoxin in diphtheria. Properly prepared sera employed at the onset of infection shorten the attack by half and in the meantime modify or arrest dysenteric manifestations. Serum when injected beneath the skin controls *mild*, *severe*, and *grave* cases of bacillary infection in two, four, or six days, but when infection is particularly virulent or serum is not sufficiently powerful, repeated injections are required, and it may take from one to three weeks to overcome diarrhea, cramps, tenesmus, and bleeding. Sera are not effective in patients suffering from lues, tuberculosis, or wasting disease except when reinforced by supportive measures.

Relapses are rare in bacillary dysentery, which seldom becomes chronic when serum treatment is inaugurated early, but when diarrhea persists the author makes occasional injections until the patient is cured.

Reliable *antibactericidal* sera are produced by injecting bacilli causing the infection subcutaneously or into the veins of horses, rabbits, or goats. Serum is administered subcutaneously in doses of 20 c.c. for adults and half the amount for children, but the quantity and frequency of injections are varied to meet indications.

The *mortality* following serum is from 33 to 50 per cent. less than after other methods of treatment, and good results obtainable in this way are indicated by a summary of 96 cases of bacillary dysentery treated by Vaillard and Dopfer, viz.:

	Stools in 24 hours.	No. cases.	Deaths.
1. Ordinary cases.....	15 to 20	50	0
2. Severe cases.....	30 to 80	18	0
3. Grave cases.....	80 to 150	24	0
4. Very grave cases.....	150 to 288	4	1

Repeated injections tend to relieve, cure, and prevent reinfection by the formation of antibodies, but no bacillary produced

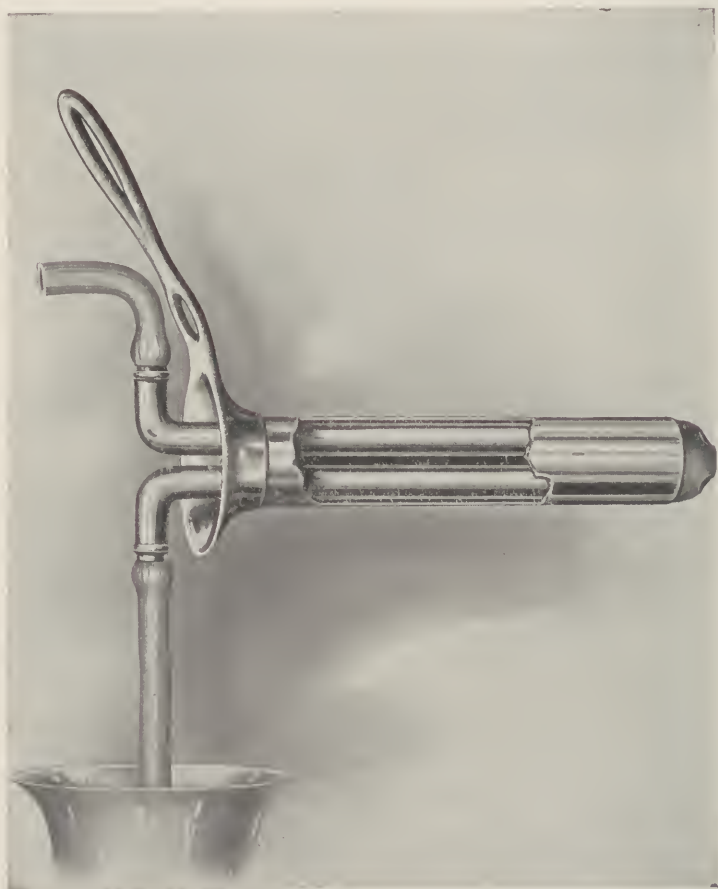


Fig. 722.—Author's two-way irrigating proctoscope, a convenient instrument for treating colitis and anorectal ulceration.

or other one serum or vaccine has been discovered that permanently immunizes the patient against all types of bacillary colitis.

Irrigating and Local Treatment.—When bacillary colitis does not respond to serum treatment in conjunction with other therapeutic measures and the disease is chronic and the bowel involved by extensive ulceration causing diarrhea and offensive frequent fluid evacuations, abdominal discomfort, and tenesmus, satisfactory results are obtained by flushing the inflamed irritable bowel once or twice daily with a normal salt or medicated solution—thymol, potassium permanganate, argyrol, ichthyol, or balsam of Peru in varying strength, 1 : 2000 : 3000 is effective for reducing inflammation and healing superficial lesions responsible for loose movements containing blood and mucus, but when diarrhea is persistent, hemorrhages are frequent, mucopurulent discharge is abundant, and feces have an unusually disagreeable odor, stronger irrigants are substituted for the above until marked improvement follows, when weaker irrigants are again employed.

In aggravated cases the author, using his proctoscopic irrigator (Fig. 722), flushes the colon at least once daily with an ichthyol solution (5 to 10 per cent.) or water Oij (1000.0) containing silver nitrate, gr. xv (1.0), which is followed by colon lavage, using a normal salt solution. The quantity of fluid employed and frequency of colonoclysis depend on severity of manifestations and



Fig. 723.—Method of inserting colon tube through a proctoscope into the sigmoid flexure when bismuth and oil emulsion colon treatments are made for bacillary, amebic, or other types of ulcerative colitis.

extent of the ulcerative process, but in all cases better results are obtained when the patient's *posture is changed* during irrigation that the solution may reach all lesions.

When the intestine is very irritable and enterospasm troublesome *cold* must be avoided and *warm* stimulating solutions alternated with warm high colonic injections of olive, cotton-seed, sweet almond, mineral, or coal-oil, \mathfrak{z} vj to Oj (180.0–500.0) (Fig. 723), alone or containing bismuth or salol, \mathfrak{z} ij (8.0), which form a protective coating over the inflamed excoriated mucosa.

Long colon tubes are useless for the purpose, as they curl upon themselves in the rectum or sigmoid flexure (Fig. 712) and irrigants and emulsions are most satisfactorily introduced with the aid of a funnel and proctoscope (Fig. 716), or short, firm, soft-rubber tube (Fig. 723), or one of the irrigators mentioned elsewhere

(Fig. 714), but in either case to obtain best results treatments are given with the patient in the inverted (Fig. 715), knee-chest, Sims', or recumbent posture with hips elevated, the bowel being massaged in the meantime, which forces the medicament into all segments of the colon.

Topical Applications.—Methylene-blue, ichthyol, balsam of Peru, 10 per cent., or silver nitrate, 6 per cent., and fulguration ap-

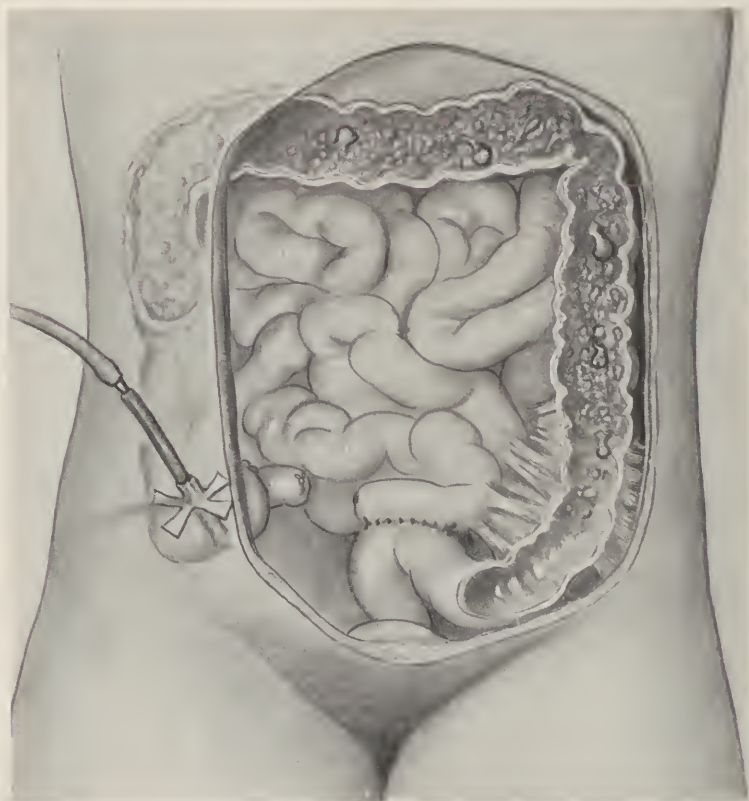


Fig. 724.—Pericolicitis complicating bacillary ileocolitis with polyposis, relieved by ileosigmoidostomy, the author's stab wound appendicostomy, severing of binding adhesions, and daily colonic irrigation with 4 per cent. ichthyol.

plied to sluggish ulcers in the sigmoid flexure and rectum hasten healing of lesions and modification or disappearance of dysenteric manifestations.

Surgical Treatment.—Operations are seldom required in the treatment of bacillary colitis, which usually responds to *sera therapy* and other therapeutic measures supported by colonic irrigations introduced *per anum*. It is often difficult and sometimes impossible

to project the irrigating solution into upper segments of the colon, and when this is not accomplished a cure is not effected because unhealed lesions continue dysenteric symptoms or cause relapses through reinfection of the lower bowel. In such cases *appendicostomy* (Figs. 1006, 1019) or *cecostomy* (Figs. 994, 999) performed after the author's technic (see Chapter XCIII) is indicated that through-and-through colonic irrigation may be carried out as often as required, using the above *irrigants*.

These procedures are not satisfactory when the patient suffers from ileocolitis because the solution does not pass the ileocecal valve, and the author's *ileocecostomy* (Figs. 988, 989) is indicated, a procedures that provides for *separate* or *simultaneous* irrigation of the small intestine and colon (Fig. 993).

In obstinate cases of bacillary infection of the small and large intestine, or both, complicated by extensive ulceration or gangrenous sloughing of the mucosa, *exclusion—entero-anastomosis* (*unilateral* or *bilateral*)—of the involved intestine is imperative that lesions may be encouraged to heal by putting the diseased bowel at rest and preventing feces, bacteria, and irritating food residues from reaching the sensitive, inflamed, and ulcerated mucous membrane (see Chapter XCV for descriptions of exclusion operations (Fig. 1059).

Enterostomy (Fig. 1022) and *colostomy* (Fig. 1032) (see Chapter XCIV), indicated in the same class of cases as intestinal exclusion, are rarely resorted to by the author because they are equally difficult to perform, patients seriously object to evacuation of feces through the side, and a second more difficult operation is necessary to close the artificial anus when a cure has been effected.

Resection of the small intestine, ileocolic angle, or colon is a dangerous procedure and justified only *when the bowel function* has been *permanently* impaired through contracting adhesions or scar tissue that press upon, angulate, narrow, or twist the gut, causing single or multiple stricture, polyposis, or extensive destruction of the mucosa. The technic of *enterectomy*, *colectomy*, and *sigmoidectomy* has been given elsewhere (see Chapter XCII).

The appendix is usually diseased in this class of cases, making *appendectomy* (Figs. 784, 785) advisable when the abdomen is opened for other purposes.

Patients afflicted with bacillary and other types of colitis rapidly improve in every way following *appendicostomy* or *cecostomy* and *through-and-through irrigation* supported by therapeutic measures that build up the system.

Chapter LXX

Protozoal Colitis—Dysentery

CILIATE, FLAGELLATE, COCCIDIC, AND BALANTIDIC COLITIS

ANIMAL protozoa alone or associated, such as *amebæ* and *entamebæ*—*rhizopodes* (see Chapter XLVIII)—*flagellates*—*mastigophores*, *ciliates*, *Balantidium coli*—infusoria—and *coccidia*—*sporozoa*—are often responsible for colitis or the dysenteric symptom-complex, abdominal pain, diarrhea, blood and mucus in the stools, and rectal tenesmus.

Having in the preceding chapter fully discussed amebic—entamebic—colitis—dysentery—it remains for the author in this



Fig. 725.—*Lamblia intestinalis*, front and profile view.



Fig. 726.—*Lamblia intestinalis* attached to an epithelial cell (Grassi and Shéviakov).

chapter to consider the above-named protozoa, known to have infected the colon, causing chronic diarrhea.

Flagellates.—These organisms, found in the small and large intestine, possess whip-like processes—*flagella*—that attach themselves to the mucosa, causing diarrhea by inciting peristalsis and mucous secretion through irritation, not by ulceration occurring in amebic and bacillary colitis.

The *Cercomonas hominis*, *Trichomonas hominis*, and *Lamblia intestinalis* (Figs. 725, 726) are the flagellates usually responsible

for protozoal colitis, a type of diarrhea common in China, Japan, and the Tropics, but seldom encountered in the United States, except when associated with amebic or bacillary infection. It is doubtful if flagellates ever independently penetrate the mucosa and cause deep ulcers.

Coccidia.—Parasitic protozoa are often found in the blood or intestines of animals, and *Coccidium cuniculi*, *C. hominis*, and *C. bigeminum* have occasionally been discovered in the feces or intestinal epithelium of dysenteric patients, usually in connection with dysenteric bacilli, amebæ, or other organisms, and their pathogenicity is not fully understood.

The *symptoms* associated with them are the same as in other forms of chronic infectious colitis and the *diagnosis* is based upon finding coccidia in the stools, epithelia, gall-duct, or liver; they are sometimes mistaken for the eggs of parasitic worms. The *treatment* does not differ from that of other types of infection where the mucous membrane is inflamed or ulcerated.



Fig. 727.—Cysts of *Lamblia intestinalis* (Grassi and Shéviakov).

Spirochetes, frequently confused with other organisms, have been encountered in the stools of healthy and patients suffering from gastro-intestinal disturbances, and when present multiply and irritate the mucosa, inducing diarrhea—spirillar colitis.

Ciliates.—These protozoan parasites are frequently discovered in patients suffering from infectious colitis alone or more often associated with *Entamæba histolytica* or dysenteric bacilla—Shiga—frequent factors in chronic colitis.

Of *infusoria*, the *Balantidium minuteum*, *Nyctotherus faba*, *N. giganteum*, *N. africanus*, and *Chilodon dentatus* are the types observed, and of these, the *Balantidium coli* only will be discussed, because this ciliate is the one usually associated with colitis.

BALANTIDIC COLITIS

Balantidia coli, the largest of protozoan parasites (Figs. 730, 731), are most often found in individuals who are pork eaters or work among hogs, but infection has been contracted by drinking contaminated water. These organisms, like other ciliata and flagellata, are usually detected in the feces or sectioned ulcers in pairs, and are more numerous during exacerbations of infection.

Histopathology.—In this type of infection lesions are numerous, widely distributed, and more extensive in run-down individuals, and are extremely difficult to heal under favorable circumstances. Tissue changes are slow but progressive and resemble those occurring in aggravated cases of amebic colitis. Usually the mucosa is highly inflamed, extensively marked by superficial or deep ulcers (Fig. 732), and smeared with blood-tinged mucus.

Balantidia sometimes penetrate deeply, leading to undermining of the mucosa (Figs. 729, 730) or perforation, and the organisms have been discovered in intestinal blood-vessels. Some authorities claim these protozoa sometimes enter lymph-channels, from whence they are carried to the liver and other organs.



Fig. 728.—*Balantidium coli* from ulcer in large intestine. Magnified 600:1 (Braun and Lucke).

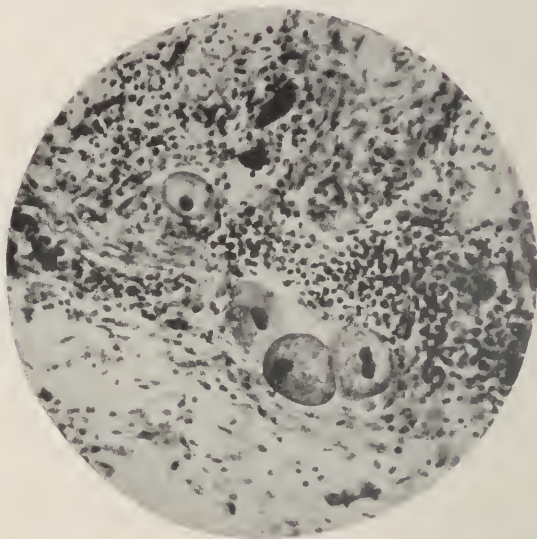


Fig. 729.—*Balantidium coli* passing from mucosa through the muscularis mucosa (Strong).

Necropsies in a series of cases have shown the bowel in different states—congested from *catarrhal inflammation*, partly covered with *diphtheric patches*, and extensively involved by *ulceration* (Fig. 732).

Symptoms.—*Balantidic* infection first induces catarrhal coloproctitis accompanied by soft evacuations containing some mucus, and if not arrested attacks of diarrhea and stools containing considerable mucus and blood ensue; in neglected cases diarrheal crises soon develop and the patient complains of the *dysenteric symptom-complex*—persistent diarrhea, bloody or mucopurulent stools, abdominal pain, tenesmus, anorexia, and indigestion.

From this time, if uncontrolled, the inflammatory process

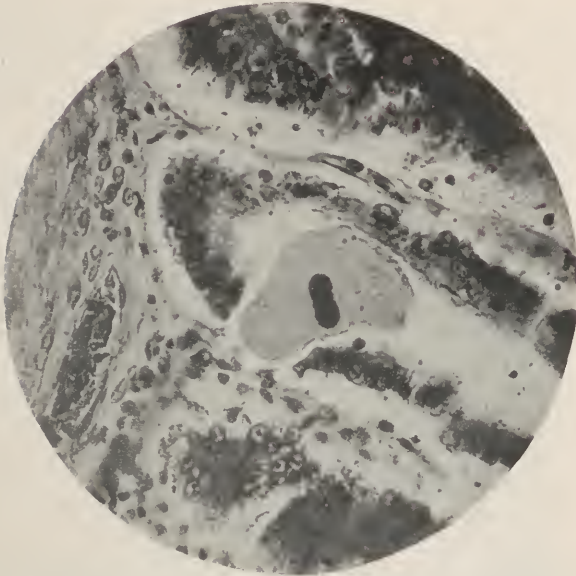


Fig. 730.—Parasite (*Balantidium coli*) passing through gland walls of Lieberkühn (Strong).

rapidly extends, mixed infection takes place, and the patient is quickly reduced by exhaustion as a result of insufficient nourishment, frequent fluid movements, hemorrhages, and colic.

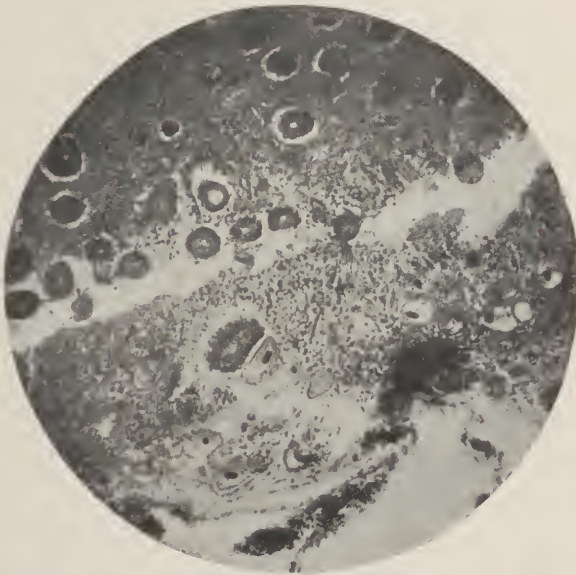


Fig. 731.—*Balantidium coli* in submucosa and surrounding tissue (Strong).
Vol. 8—2

The symptoms of bacillary and amebic colitis and colonic infection due to *Balantidia coli* are almost identical in aggravated cases, and clinical differentiation is often impossible except by finding the organism responsible for the infection.

Diagnosis.—When the patient complains of the usual symptoms of chronic ulcerative colitis and *Balantidia coli* are detected in fresh warm feces, scrapings, or tissue removed from ulcers (Fig. 732),



Fig. 732.—Colon showing ulceration due to infection with *Balantidium coli* (Bowman).

a diagnosis of protozoal or *Balantidic colitis*—dysentery—is made, but when these organisms are associated with Shiga bacilli or *Entamœbæ histolytica* the case is diagnosed as *mixed infection colitis*.

Treatment.—Since the *hygienic, supportive, medicinal, irrigating, and surgical* treatment of *balantidic* differs slightly or not at all from that recommended for *bacillary* and *amebic colitis* outlined in previous chapters further discussion of the subject is deemed unnecessary.

Chapter LXXI

Parasitic Diseases, Helminthic Colitis

TENIASIS, UNCINARIASIS—ANKYLOSTOMIASIS—TRICHINIASIS, ASCARIASIS, OXYURIASIS, TRICHURIASIS—TRICOCEPHALIASIS, STRONGYLOIDOSIS, AND SCHISTOSOMIASIS

TAPE-, HOOK-, ROUND-, FLUKE-, AND WHIP-WORMS

HELMINTHS frequently cause gastro-intestinal disturbances, rectocolonic irritation, constipation, diarrhea, rectal tenesmus, colic, or crawling sensations in the bowel, and considerable patience and ingenuity are required to permanently eliminate them.

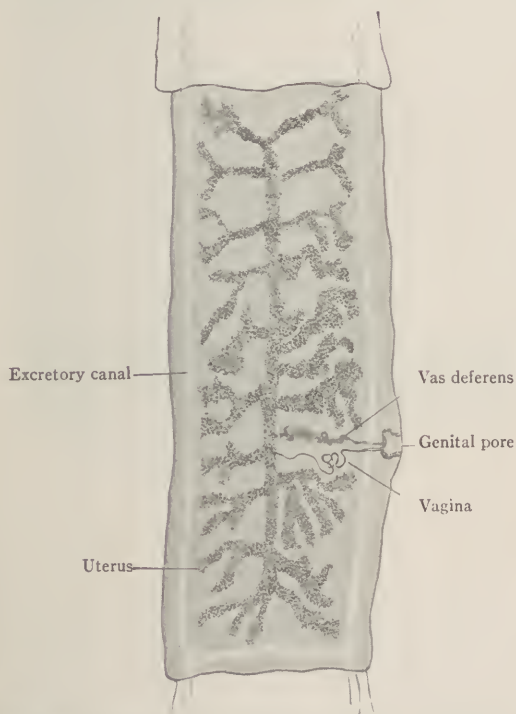


Fig. 733.—*Tænia solium*, gravid segment. (Original.)

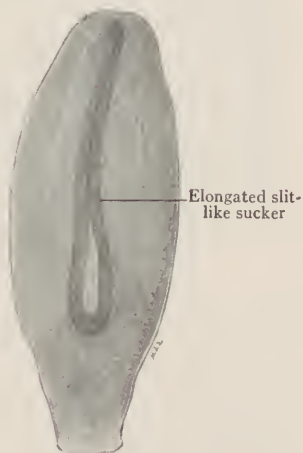


Fig. 734.—Head of *bothriocephalus*. (Original.)

Helminthiasis may be induced by different types of parasitic worms belonging to one of three groups: (a) cestodes, (b) nematodes, and (c) trematodes.

Cestodic—Tapeworm—Infection, Teniasis.—Teniasis in man may be induced by *pork*—*Tænia solium*, *beef*—*T. saginata*, *fish*—*T. lata*, *Bothriocephalus latus* (Fig. 734), and *dwarf*—*T. nana*, tapeworms, of which *Tænia saginata* are most frequently encountered.

***Tænia Solium*.**—Pork tapeworms (Fig. 733) are armed, vary in length from $6\frac{1}{2}$ to 13 feet (2–4 meters), and are commonly met with in pork eaters where cysts in improperly cooked, infected meat subsequently break down, permitting heads of the parasites to

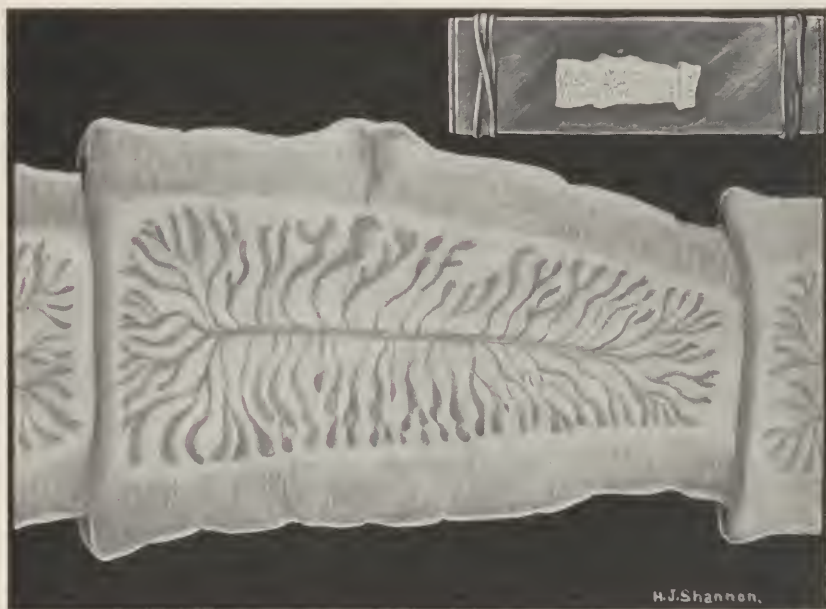


Fig. 735.—*Tænia saginata*. Appearance of gravid segment without magnification. Method of making diagnosis by pressing segment between glass slides. (Original.)

attach themselves to the mucosa and develop worms as individual segments form.

***Tænia saginata*,** or beef tapeworms, are unarmed, long, thick, possess from 1 to 3000 segments, vary in length from 13 to 40 feet (4–12 meters), and have a dark cuboid-shaped head lacking hooks. In this type of infection segments appear within two or three months, and Styles has estimated these tapeworms (Fig. 733) produce 150,000,000 eggs in a year and develop 13 segments daily.

***Tænia lata*,** fish tapeworms, are the longest of cestodes and in exceptional instances have measured 65 feet (20 meters). Infection is derived from pike, perch, salmon, and other fresh-water fish.

Tænia nana, or dwarf tapeworms, vary from $\frac{1}{5}$ inch to $1\frac{1}{4}$ inches (5.08 mm.—3.18 cm.) in length, and are often overlooked because of their diminutive size (Figs. 736, 737),

Symptoms.—Tapeworms induce slight or distressing manifestations—anorexia, nausea, vomiting, colic, tickling sensation, itching of the nose or anus, nervousness and obstinate constipation, enterospasm, or persistent diarrhea when irritation is marked and parasites cause catarrhal inflammation of the mucosa.

Diagnosis.—Teniasis is diagnosed by eliciting the above symptoms and microscopically and macroscopically examining feces for worms, their segments or ova, and Charcot-Leyden crystals, which, if found, complete the diagnosis.

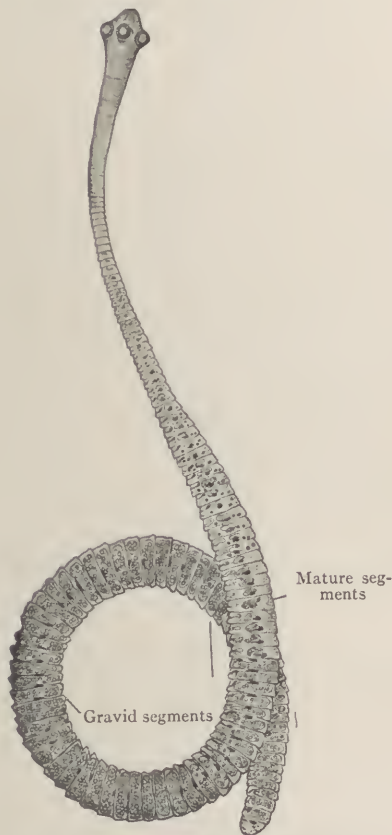


Fig. 736.—Tænia—Hymenolepis nana.
(Original.)

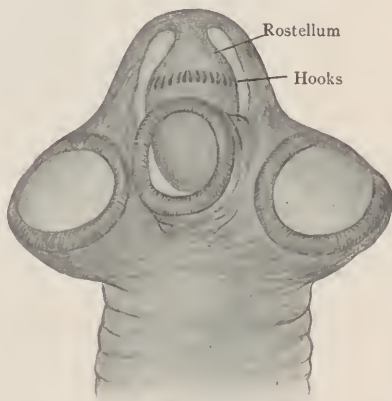


Fig. 737.—Head of Tænia—Hymenolepis nana. (Original.)

In 2 instances the author has discovered tapeworms through the sigmoidoscope (Fig. 738).

Treatment.—Possibility of helminthic infection is lessened by avoiding unhealthy or insufficiently cooked pork, beef, fresh-water fish, and unsterilized water.

It is easy to bring away segments, but difficult to expel tightly clinging heads of tapeworms, which is necessary to prevent re-formation of parasites.

Successful treatment is complex and consists in (a) keeping

the patient on fluids for a day or two, (b) thoroughly cleansing the bowel with salts or calomel, (c) administering a *teniafuge*, such as male fern, ℥ss to ij (2.0–8.0); pomegranate root, fluidextract, ℥ss to ij (2.0–8.0); pumpkin seed or pelletierin, gr. v to vij (0.30–0.50), to dislodge the parasite, and (d) prescribing a purgative—castor oil, ℥j (30.0), or calomel, gr. x (0.60), followed by magnesium sulphate, ℥ij (8.0 c.c.), to cause excessive peristalsis and expulsion



Fig. 738.—Tapeworm—*Tænia solium*—worming its way through the rectosigmoidal juncture into the rectum as seen through a proctoscope.

of the worm. When this treatment fails, good results may be obtained with one or the other *vermifuges* suggested by Cohnheim, viz.:

℞. Extracti filicis maris æther.....	gtt. xlviii–lx	3|0–4.0;
Chloroformi.....	gtt. vj	0|36;
Olei ricini		
Mucilaginis acaciæ}.....	āā ℥j	30|0;
Aquæ destillatæ.....	q. s. ad. ℥ viiss	200|0.

M. ft. emulsio.

Sig.—Introduced through a stomach-tube early in the morning.

℞. Graniti corticis.....	℥j–iss	30|0–50.0;
Mac. per hor. xii, cum 200–300 aq. dest. deinde		
coque ad remanentiam.....		150|0.

Sig.—Drink or, preferably, introduce through a stomach-tube early in the morning.

Round-worm—Nematodic—Infection.—These parasites, which are round, devoid of segmentation, variable in size and thickness, are encountered frequently in certain sections of the country, particularly in children who eat rotten apples, and *nematodes* are responsible for *uncinariasis*—hookworm infection—*trichiniasis*, *ascariasis*, *oxyuriasis*, *trichuriasis*, and *strongyloidosis*.

Uncinariasis—Hookworm Disease.—Dirt eaters' anemia or hookworm disease is prevalent in warm or tropical communities where the atmosphere is moist and the soil sandy. The infection,

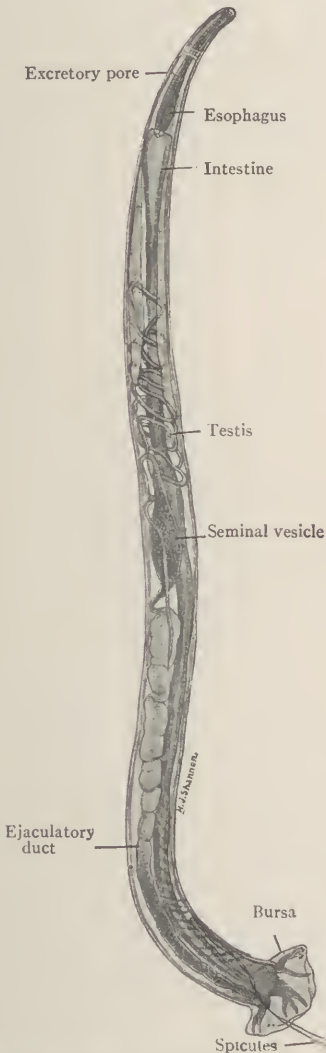


Fig. 739.—Male *Ankylostoma duodenale*. (Original.)

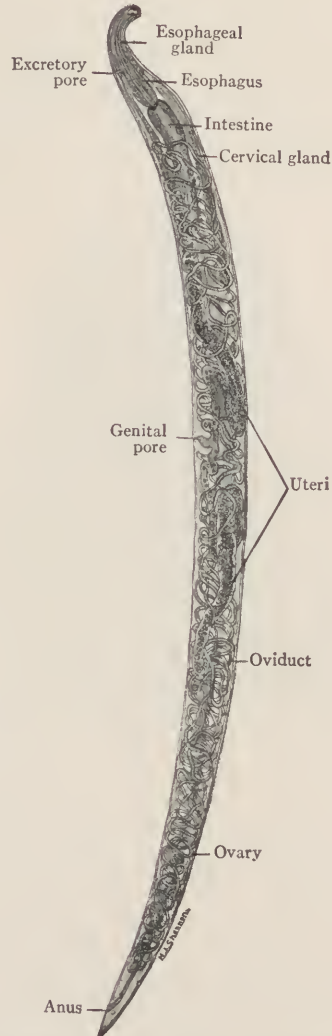


Fig. 740.—Female *Necator americanus*, lateral view. (Original.)

which is caused by *larvæ* of the *Ankylostoma duodenale* (Fig. 739) or *Necator americanus* (Fig. 740), gains entrance to the circulation through the skin, chiefly in people who go bare-footed, from whence it is carried to the small intestine, where hookworms develop,

though in rare instances larvæ have been carried to the alimentary tract by contaminated water and food.

These parasites (Fig. 741) subsist on blood plasma and red corpuscles withdrawn by means of a hook which attaches them to the mucosa, and are grayish when empty and brownish in color when distended with blood. Bleeding, which is often continuous, takes place through diminutive puncture wounds left when parasites change their position and the mucous membrane of the infected gut, usually the *ileum*, is congested and dotted with hemorrhagic spots.

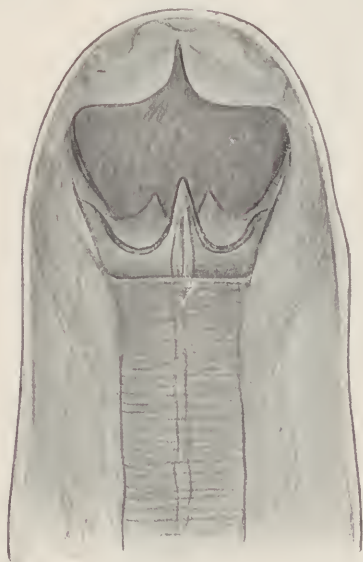


Fig. 741.—Head of *Necator americanus*. (Original.)



Fig. 742.—Female *Necator americanus*, natural size. (Original.)



Fig. 743.—Male *Necator americanus*, natural size. (Original.)

Symptoms.—Children afflicted with hookworm disease are undeveloped and adults are weak and have little energy. Anemia is the characteristic manifestation of uncinariasis, but these patients also complain of diarrhea alternating with constipation, impoverished digestion, cardiac disturbances, mental incapacity, and sometimes ascites with difficult breathing.

Nearly all hookworm patients have a *perverted appetite* and *relish* charcoal, wood, dirt, and particularly clay, on account of which they are often designated as *dirt eaters*.

Diagnosis.—Anemic individuals having a perverted appetite who live in districts where infection is common should be suspected of having hookworm disease, but to complete the diagnosis it is necessary to discover *Ankylostoma duodenale* or *Necator ameri-*

canus, their ova, and Charcot-Leyden crystals, the usual causes in the United States.

Prognosis.—In neglected cases patients rapidly become anemic and sooner or later succumb to heart or lung complications, but when infection is mild and properly treated cures are not uncommon.

Treatment.—Best results are obtained by restricting the diet to liquids for a few days and clearing the bowel with salts, which is followed by the administration of *thymol* or *beta-naphthol*, gr. xv (1.0), hourly until several doses have been taken, and then prescribing magnesium sulphate, ʒij (8.0 c.c.), to wash out the drug and expel parasites and ova. Thymol is the agent of choice in this class of cases.



Fig. 744.—Egg of *Necator americanus* developing embryo. (Original.)



Fig. 745.—Egg of *Necator americanus* embryo escaping from shell. (Original.)

Trichiniasis.—This disease, caused by *Trichinella spiralis*, is derived from pork, where *larvæ* of infected meat freed by digestion reach the intestine and produce living embryos that migrate to muscles, where they become encysted and remain inactive or cause irritation and suppuration.

The chief **symptoms** of trichiniasis are gastro-intestinal disturbances and diarrhea, which are pronounced shortly following the eating of infected meat and when embryos are passing from gut to muscles.

The **treatment** consists in catharsis, administering anthelmintics, and incising and draining or extirpating infected areas.

Ascariasis.—This affection, induced by *round* or *lumbricoid worms*, common in the United States, is most frequently encountered in children between the ages of three and twelve years who eat infected raw fruit. The infection is derived from *eggs* carried to the body in contaminated water, fruit, or food, and follows dissolving of

their coverings by gastric juice; worms attain maturity in about a month from the time eggs appear in the feces (Figs. 746, 747).

Ascaris lumbricoides usually find a habitat in the small intestine, but have been discovered in the esophagus, stomach, ducts, appendix, colon, and rectum. In a case of the author's following appendicostomy for colitis a large lumbricoid worm escaped through the appendical opening (Fig. 751), badly frightening the patient. These parasites occasionally induce complete intestinal obstruction, as occurred in Wheland's case, where a boy aged five and a half years died from obstruction and perforation (Figs. 749, 750), and that of Takaki's patient, a child three years old, relieved of acute obstruction following the vomiting up of 117 ascarides within nine days.

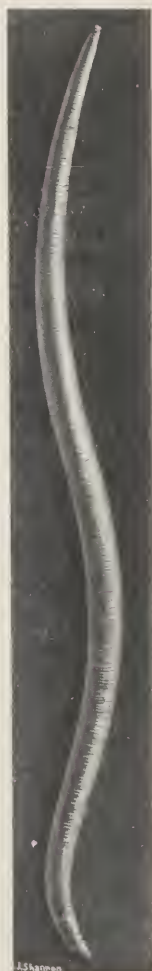


Fig. 746.—Female adult *Ascaris lumbricoides*. (Original.)

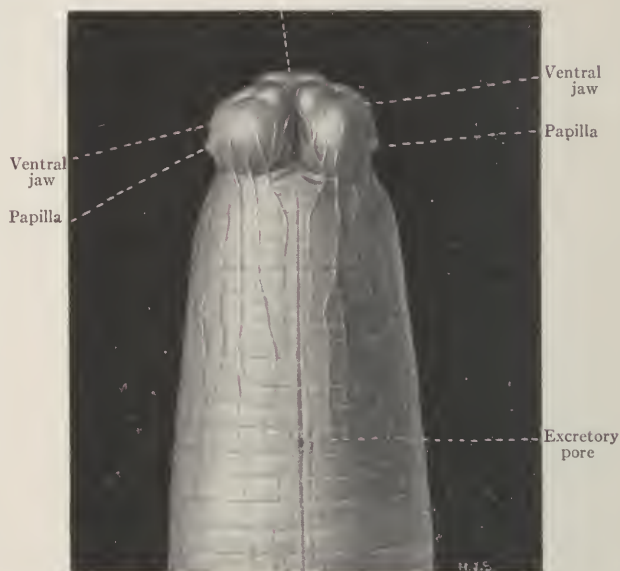


Fig. 747.—Head of *Ascaris lumbricoides*—round worm. (Original.)

Symptoms.—Characteristic manifestations of lumbricoid worms are restlessness day and night, abnormal appetite, occasional nausea and vomiting, intestinal pain, crawling sensation, constipation, frequent stools containing mucus, indigestion, convulsions—in young children—itching of the nose and anus, and in rare instances



Fig. 748.—Round—lumbricoid—worms working their way over the rectal valves toward the anus, as they appeared through a proctoscope.

symptoms of acute obstruction or perforation and peritonitis. Whalen has reported a case where lumbricoid worms caused intestinal obstruction and perforation (Figs. 749, 750).



Fig. 749.—Complete obstruction and perforation of the small intestine caused by *Ascaris lumbricoides*.

Diagnosis.—Worms in the sigmoid and rectum are quickly discovered through the sigmoidoscope, but ascariasis is usually diagnosed by the discovery of adult parasites, pieces of worms or



Fig. 750.—Collection of *Ascaris lumbricoides* causing complete obstruction and perforation of small intestine. Appearance of gut after being opened.

their ova in fresh feces examined macroscopically and microscopically.

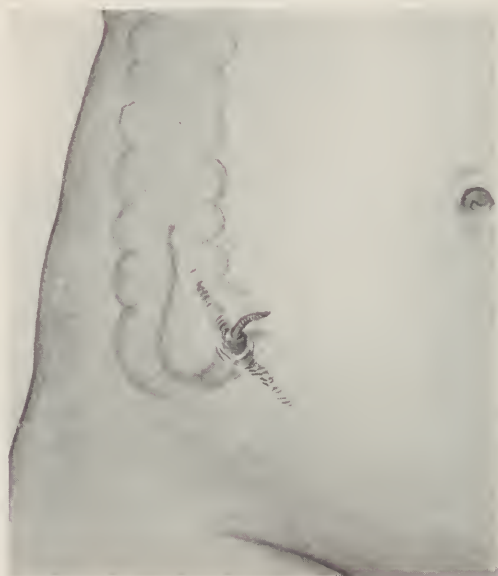


Fig. 751.—Lumbricoid worm as it appeared crawling through an appendicostomy opening in the author's case.

Treatment.—Santonin, gr. j to iv (0.06–0.24), preceded by a fluid diet and accompanied by castor oil, ℥ss to j (15–30 c.c.), or

calomel, gr. v (0.30), administered for three successive evenings, is the most reliable agent in this type of parasitic infection.

When the above treatment fails to cause expulsion of dead or worms clinging to the bowel, their evacuation is accomplished by frequent copious high normal saline enemata or a strong purgative.

The dose of *santonin* for *children* is about one-sixth of that prescribed for adults.

Oxyuriasis—Oxyuris Vermicularis—Pin=, Thread=, or Seat=worm Infection.—Oxyuriasis is encountered in all climates, both sexes, and at all ages, but is met with most frequently in men and children. *Oxyuris vermicularis* (Fig. 752), pin- or thread-worm, infection is quite common and may induce slight or no disturbance, or drive the patient to distraction where parasites collect in large numbers and cause intense itching at the anus (Fig. 754).

Pin—thread—worms are whitish in color, resemble a short

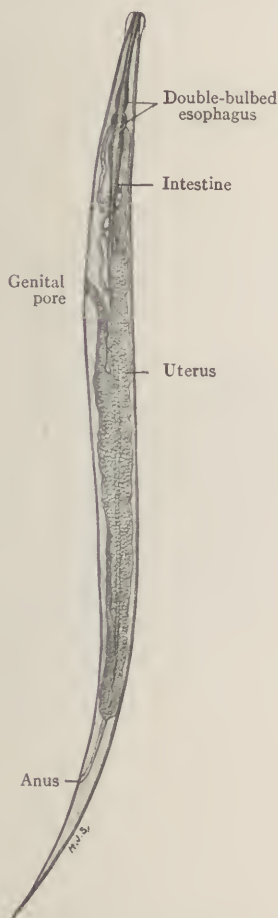


Fig. 752.—*Oxyuris vermicularis*, female.
(Original.)



Fig. 753.—Egg of *Oxyuris vermicularis*.
(Original.)

piece of fine white thread, may be straight or curved, vary in length from $\frac{1}{10}$ to $\frac{2}{5}$ inch (2.54–10.16 mm.) (Fig. 754) in length, and are often overlooked unless a magnifying glass is employed when searching for them.

Three lip-like projections extend from the *head* and the *tail* of

the *male* is provided with six pairs of papillæ, while the tail of the female possesses two uteri.

Eggs responsible for pin-worms are transported to the mouth by food, water, or fingers. Ova and parasites are often discoverable beneath the nails of persons suffering from pruritus ani induced by thread-worms, and it is easy to understand how such individuals may infect their food, knives, forks, etc.

Swallowed eggs hatch in the stomach, enter and remain in the small intestine until they reach sexual maturity, and then migrate to the cecum (Fig. 754)—where they are found in greatest numbers—colon, and rectum; the female in the meantime deposit-

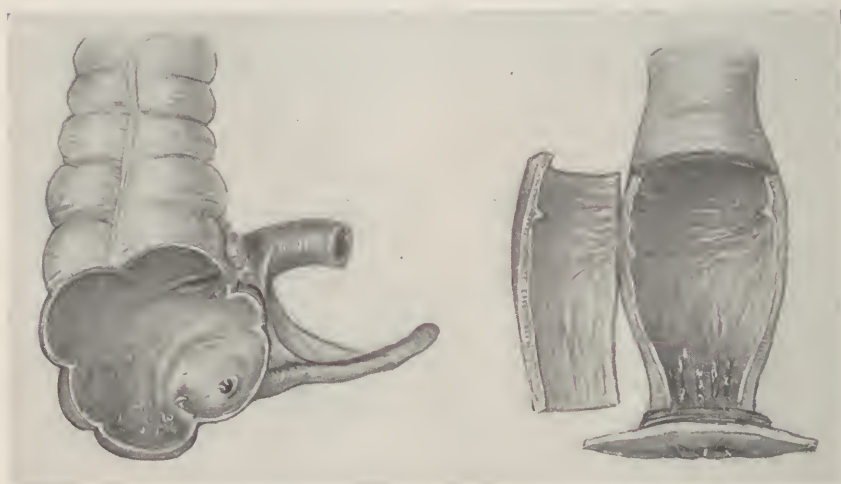


Fig. 754.—Thread-worms—*Oxyuris vermicularis*—located in the cecum, appendix, and anal canal. These parasites are frequently responsible for enuresis, convulsions, and pruritus ani in children and infants.

ing an enormous number of eggs, which are expelled without producing parasites.

Pin-worms are not capable of crawling from one to another individual to infect him, and reliable authorities hold that multiplication of parasites does not ensue when worms enter the body *per anum*, and that eggs must gain entrance to the body *through the mouth* for infection to take place; about fourteen days are required to develop an adult worm.

Pathologic changes are slight in *oxyuriasis* and are characterized by catarrhal, rectocolonic inflammation and excoriation, and fissures of the anal mucosa and perianal skin caused by the patient's scratching or rubbing the parts in his efforts to secure relief from

the tormenting itching incited by pin-worms. Appendicitis and submucous abscesses have been attributed to these parasites.

Symptoms.—The proctologist has to deal more frequently with thread—pin—than any other variety of intestinal worms, and his ingenuity is taxed to the fullest extent in relieving or curing these patients.

Characteristic manifestations of the disease are intermittent or continuous intolerable itching, crawling, or tickling sensations induced by wriggling worms in the rectum or caught in creases or fissures in anal mucosa or skin of the perianal region; the degree of pruritus being proportionate to the number and activity of parasites.

Irritation caused by pin-worms incites sphincteric contraction causing constipation, and stimulates the hypersecretion of mucus which seeps through the anus and excoriates the skin. From what has been said it is easy to understand why patients thus afflicted are nervous, suffer from insomnia, and threaten to commit suicide if not relieved.

Tickling sensations are worse at night and continue until parasites are displaced during defecation, washed out by an enema, or destroyed by the patient's finger in his attempt to remove wriggling worms. Individuals suffering from oxyuriasis frequently withdraw from society because they fear parasites will come down, start itching, and they would be unable to relieve themselves.

Pin-worms have wriggled their way to the vulva, vagina, and urethra to cause itching or lead to masturbation, and in rare instances parasites have been carried to the prepuce and male urethra by the fingers, causing pruritus, erections, nymphomania, or masturbation.

Diagnosis.—Oxyuriasis is suspected in cases of recurring intense pruritus without apparent lesions to account for itching. By inspecting the mucosa and skin macroscopically or through a *magnifying glass* after the anus has been everted and creases have been smoothed out, dead or wriggling worms can be detected (Fig. 754), and eggs may occasionally be discovered microscopically in scrapings taken from the anal region. When oxyurids are not found in this way they may be brought down with a warm enema, when they are seen floating in the water.

Prognosis.—Oxyuriasis never terminates fatally, but the prognosis as to a cure is frequently not good, because the line of treatment followed by most physicians is not effective, since remedial agents are applied principally to the rectum and do not reach parasites higher up in the intestine.

Treatment.—Prophylaxis consists in taking precautions against

introduction of parasites into the body by carefully preparing food and water, and having infected patients sterilize their finger-nails before eating. Tonics to strengthen the patient and build up impoverished blood are seldom necessary, but agents, including arsenic, that improve the nervous system, court sleep, and diminish restlessness are advantageous.

Internal medication is helpful, but not completely successful unless reinforced by local treatment. Calomel and salts that encourage frequent fluid evacuations assist in destroying and washing out worms and ova, but better results are obtained when catharsis is accompanied or followed by the administration of *santonin*, gr. j to iv (0.06–0.024), or other reliable *anthelmintic*.

Relief from thread-worms and a permanent cure is invariably accomplished in a shorter time when the above treatment is reinforced by frequent complete colonic irrigations introduced *per*

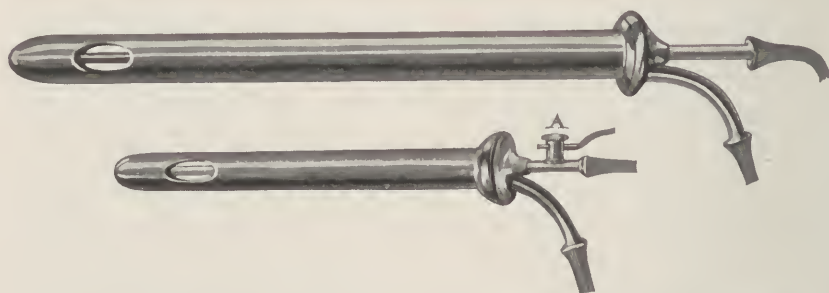


Fig. 755.—Kemp's irrigator fitted with (A) an attachment for electro-enteroclysis.

anum (Fig. 755), for which purpose the author has found the following irrigants effective: Saline, ℥j (4.0); vinegar, ℥iss (6.0); quassia, ℥j (30.0), or turpentine, ℥j (4.0), and benzine, ℥v to x (0.3–0.6), in a pint of water; ichthyol, 10 per cent., and silver nitrate, gr. xv (1.0), to the quart of water have also given satisfactory results.

It is doubtful if pin-worms or their ova are destroyed by the chemical agent contained in the solution, and the author attributes the beneficent action derived from salt irrigation and high enemata chiefly to the mechanical action of the fluid in dislodging and washing out parasites and their ova.

When oxyuriasis does not promptly respond to the above therapeutic measures and swabbing the lower rectum and perianal region with argyrol 25 per cent., silver nitrate 8 per cent., or a weak iodine solution, the irrigant is not reaching the cecum, the *habitat* of pin-worms.

Under such circumstances and when parasites are particularly

numerous and very tormenting from the beginning, the author performs *appendicostomy*, *cecostomy* (Figs. 999, 1006), or Gant's *ileo-cecostomy* (Fig. 992), so that through-and-through colonic irrigation may be practised as often as required, using one of the irrigants already mentioned.

Suppositories in the following combination inserted two or three times daily relieve itching and tend to destroy pin-worms lodged in the anal canal:

R.	Mercurial ointment.....	gr. iv	0 4;
	Benzoinated lard.....	gr. viij	0 53;
	White wax.....	gr. viij	0 53;
	Cocoa butter.....	℥ss	2 0.—M.

When the perianal skin is irritated, raw, or thickened incident to pin-worms or resultant scratching, marked relief is obtained by applying unguentum phenolis or the accompanying ointment:

R.	Belladonnæ extract.....	gr. x	0 6;
	Hydrargyri chloridi mitis.....	gr. xij	0 8;
	Morphinæ sulphatis.....	gr. viij	0 53;
	Petrolati.....	℥j	3 0.
Misce et fiat unguent.			
Sig.—Apply freely to the lower rectum and perianal region.			

Trichuriasis—Whip-worm Infection.—This disease, encountered in other countries, mostly tropical, is rare in the states. It is caused by worms, usually the *Trichuris trichiura*, parasites harbored chiefly in the cecum. These worms which, owing to their resemblance to a *black snake whip* (Fig. 756), have been designated *whip-worms*, do not produce important changes in the mucosa except when numerous or virulent, and penetrate the mucosa or transfix its folds, causing slight bleeding and paving the way for mixed infection that leads to anemia.

They are sometimes responsible for gastro-intestinal *symptoms*—digestive disturbances, abdominal discomfort, diarrhea, and blood and mucus in the stools, in addition to causing restlessness, headache, and anemia. Trichuriasis is *diagnosed* by discovering *whip-worms* or their *ova* in freshly examined stools.

Strongyloidosis.—Nematodes responsible for this infection resemble *diminutive snakes* as they *flash* across the microscopic field. Strongyloidosis is prevalent in China, Italy, and the Philippines, and parasites ordinarily attack the small intestine, penetrating mucosa or Lieberkühn's glands, whence they derive nourishment and deposit eggs.

Symptoms.—The infection may be accompanied by slight

disturbance or induce distressing irritative diarrhea when worms are active and present in large numbers.

Diagnosis is based on finding *Strongyloides intestinalis*, their ova or larvæ in feces or scrapings of infected areas.

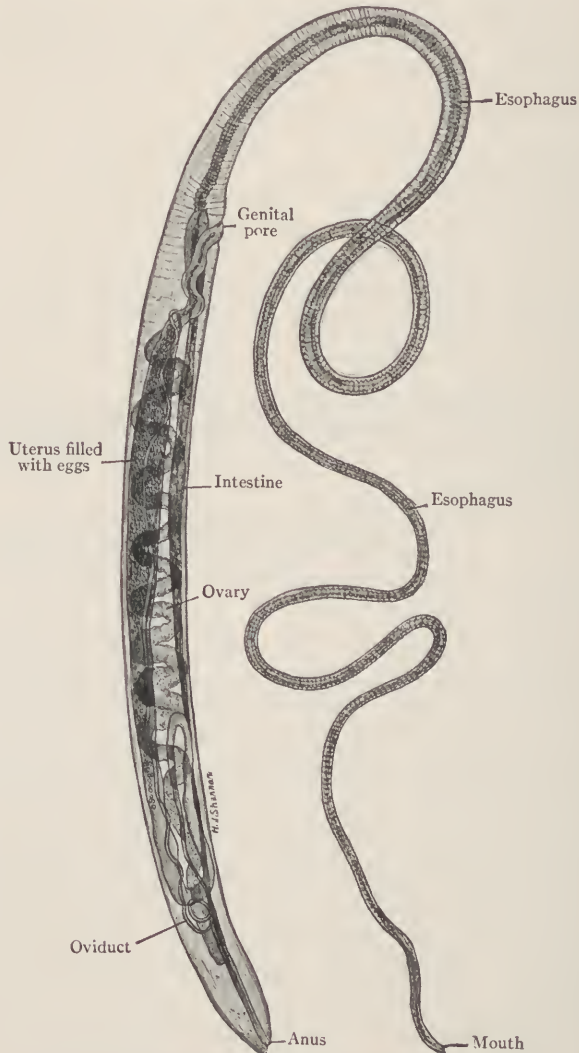


Fig. 756.—*Trichuris trichiura*, female. (Original.)

The treatment embraces taking measures to prevent reinfection by way of the mouth and frequently administering thymol, gr. xv (1.0), the most effective agent for destroying and expelling these parasites and their ova.

In his recent work, *Diarrheal, Inflammatory, and Parasitic Intestinal Diseases*, 1915, the author has fully considered the relation of the following parasites to rectocolonic diseases—*Æsophagostoma brumpti*, *Trichostrongylus*—*Trichostrongylus instabilis*, *T. proboluris*, and *T. vitrinus*—*Tridontophorus diminutus*, *Physaloptera*—*caucasica* and *mordens*—and *Stongylus gibsoni*, and their further discussion here is unnecessary.

Schistosomiasis—Trematodic—Fluke=worm Infection.—*Trematodes* are rarely discovered in the United States, but schistosomiasis is not uncommon in the Philippine Islands and tropical countries. There are several varieties of fluke-worms, but we are chiefly concerned with *Schistosoma japonica*, *S. hematobium*—*Bilharzia hematobia*—*S. mansoni*, parasites that sometimes cause serious local and systemic disturbances—enlargement of the liver, spleen, appendices epiploicæ, or mesenteric glands, cachexia, anemia, diarrhea, hematuria, and exhaustion, in addition to extensively involving the rectum or bladder, which is characteristic of the disease.

Schistosomidæ (Figs. 757, 758) have been discovered in veins, arteries, liver, gall-bladder, pancreas, mesenteric glands, vesical wall, brain, and intestinal submucosa from the cecum to the anus, and elsewhere, and ova have been encountered in the portal vein, liver, brain, rectal growths, etc.

In Katto's case, in addition to other changes, the *colon* and *sigmoid flexure* were greatly *thickened throughout*, the mucosa *congested, inflamed, friable*, and marked by *erosions* and *necrotic areas*, the bowel wall *rigid* and *cartilaginous-like*, and the rectum *enormously enlarged, indurated*, and $\frac{3}{4}$ inch (19.05 mm.) thick opposite the bladder, and when sectioned resembled cartilage.

Cases have been reported where the *bladder* was normal, greatly distended, or the rectovesical pouch obliterated, and in one instance vesical submucosa of the bladder contained schistosomidæ.

Nanson says the parasite discovered by him inhabits chiefly the mesenteric vein, deposits ova in the rectal submucosa, and induces diarrhea and tenesmus.

Fluke-worms, after having entered the intestine, sometimes pass onward to the portal vein or migrate to other vessels—mesenteric and hemorrhoidal.

Symptoms.—Intestinal schistosomiasis is accompanied by congestion, thickening, and ulceration of the mucosa, conditions responsible for diarrhea, abdominal pain, and discharge containing blood, mucus, and pus.

When the rectal wall has been involved by schistosomidæ its tunics feel indurated and markedly thickened and the mucosa is dotted over with polypoid excrescences or large soft adenomata-like growths that when incised contain fluke-worms. Occasionally the

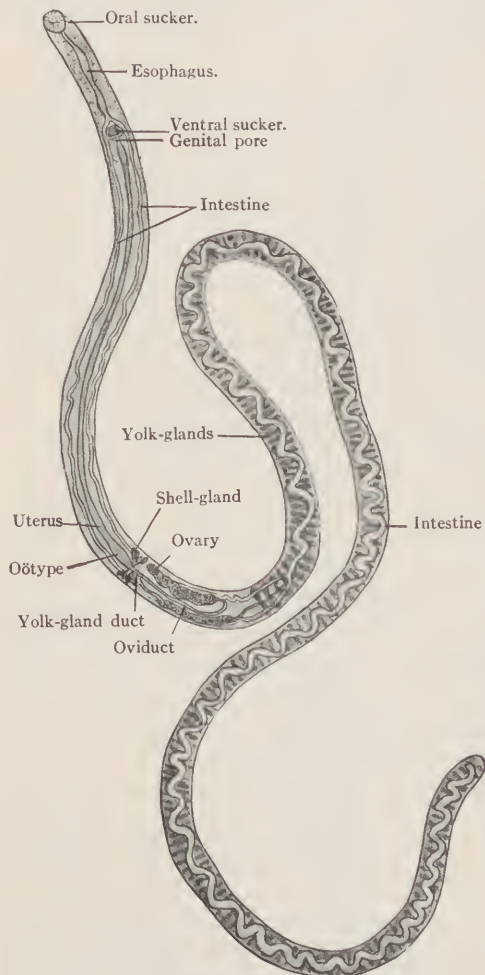


Fig. 757.—*Schistosoma hæmatobium*, female. (Original.)

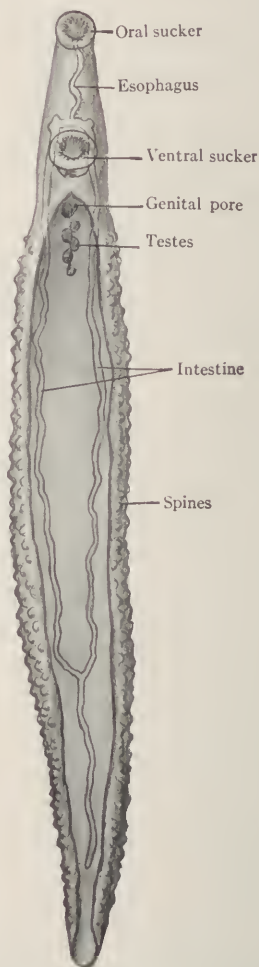


Fig. 758.—*Schistosoma hæmatobium*, male. (Original.)

sacrococcygeal region is also infiltrated and the patient complains of backache.

Urinary schistosomiasis—endemic hematuria—*bilharziasis*—is characterized by early hematuria, frequent micturition, tenesmus, cystitis, perineal pain, and the bladder wall is thick and vesical

mucosa marked with papillomata. Often the rectovesical septum is diseased or obliterated, diarrhea and rectal tenesmus are troublesome, and the anterior surface of the bowel is covered with a *cauliflower-like growth*. In these cases infection of the vagina, kidneys, or lungs is occasionally observed.

Diagnosis.—Schistosomidæ infection is often confused with amebic, balantidic, and other specific colonic and rectal infections, causing dysenteric manifestations, but is differentiated from them by finding *Schistosoma japonica*, *S. hematobium*, or *S. mansoni*, or ova in the stools, thickened indurated rectum, bladder, or rectovesical septum (Figs. 757, 758), and papillomata or larger soft growths in the rectal and vesical mucosa discoverable by digital exploration, sigmoidoscopy, and cystoscopy.



Fig. 759.—Developmental form of *Schistosoma hæmatobium*, egg showing miracidium. (Original.)

Prognosis.—Good results are obtained when intestinal schistosomiasis is recognized early, extension of infection is prevented, and the patient receives intelligent treatment, but in neglected cases where infection is permitted an uninterrupted course serious lesions develop in the rectum, bladder, or elsewhere that eventually cause death.

Treatment.—No specific has been discovered for schistosomiasis and convalescence is slow, but much can be done toward relieving or curing this class of sufferers.

Intestinal and vesical lesions are usually healed by frequent irrigations, using mild antiseptics and topical applications, a plan of treatment that aids in destroying parasites and their ova. Rest in bed, restricting the diet to fluid foods and administering astrin-

gents during exacerbations of diarrhea and hemorrhage are helpful, and urotropin, gr. v (30.0), four times daily modifies symptoms when hematuria is troublesome.

Good results in the author's cases followed *appendicostomy* and flushing the bowel frequently with an ichthyol 5 per cent. or boric acid solution, and applying silver nitrate 6 per cent. to ulcers located in the lower sigmoid and rectum.

Papillomata and large rectal polyps are destroyed by *fulguration*, or removed by placing a Gant valve clamp on their pedicles, which through *pressure necrosis* causes them to drop off. Large schistosomotic growths are extirpated by elliptic incision or rectal extirpation.

Colostomy is resorted to in extreme cases when the bowel is occluded and less objectionable procedures are contraindicated; abscesses and fistulæ are *incised* and *drained*.

The reader is referred to Gant on Diarrheal, Inflammatory, and Parasitic Diseases of the Intestine, 1915, for a study of other types of fluke-worms—schistosomidæ.

Chapter LXXII

Hemorrhagic Colitis

SLIGHT or profuse *bleeding* is a frequent manifestation of rectocolonic affections and at some time complicates catarrhal and specific colitis, polyposis, cancer, invagination, embolism of the mesenteric artery, hyperemia of the intestine due to heart, lung, or liver disease complicated by stasis of the portal system, foreign bodies, impacted feces, injury to the mucosa, tubercular and syphilitic lesions, typhoid and other acute fevers, hemorrhoids and fissure, and is sometimes encountered in persons having a high blood-pressure and arteriosclerosis.

Hemorrhagic colitis is characterized by daily slight or profuse hemorrhages and frequent exhausting stools, symptoms that increase in severity as infection extends. Hemorrhagic colitis is usually encountered in young adults and occurs more frequently in men than women (5 to 1), and rapidly leads to secondary anemia, though a reasonably high percentage of *hemoglobin* obtains.

The inflammatory process usually limited to the colon is probably an infection, but has not yet been attributed to any particular specific organism. In this form of colitis the inflammation is virulent, sometimes involves all tunics of the gut, and may induce localized peritonitis, but ulcers are not as deep nor is the mucosa so undermined as in types of chronic colitis complicated by mixed infection.

Patients from the onset complain of the enormous amount of bright red or clotted blood lost, fast thready pulse, temperature, weakness, dizziness, failure to digest food, and diarrhea, but are not troubled seriously with abdominal cramps or tenesmus except at beginning of the infection. Stools which vary in frequency from ten to thirty daily and occur in rapid succession contain considerable blood, some mucus, pus, and undigested food remnants.

The **pathology** of hemorrhagic colitis is not understood, nor is it known whether the disease is an entity or variation of some other known type of colitis, characterized by small or extensive areas of *spongy mucosa* (Fig. 760), from which *blood oozes almost continuously*, or when traumatized by feces, digital examination, or introduction of instruments. In some of the author's cases bleeding occurred at *widely scattered superficial mucus-smear*

lesions, and in others from all sides of the excoriated bowel or extensive, broad, seemingly raised patches having an uneven surface resembling the mucosa in follicular colitis. Hemorrhage may be started or increased by wiping lesions with a swab, squeezing them between fingers, or having the patient strain downward, and bleeding thus started continues for a considerable period.

Symptoms and Diagnosis.—Hemorrhagic is diagnosed from other forms of colitis by the large amount of blood lost daily, absence of tenesmus, slight discomfort from abdominal pain or



Fig. 760.—Hemorrhagic coloproctitis cured by ilcostomy, appendicostomy, and through-and-through irrigation.

cramps, small amount of mucus and pus in the stools, and failure to detect Shiga or other dysenteric bacilli, *Entamœbæ histolytica*, *Balantidia coli*, flagellata, ciliata, helminths, or other recognized causative agents in colitis.

In cases of *exhaustive diarrhea* accompanied by very *profuse rectal hemorrhages*—bright red or clotted blood—and complicated by distressing *anemia*, a diagnosis of hemorrhagic colitis is justified; when large or small superficial erosions and ulcerated lesions are raised, sponge-like patches (Fig. 760) having an uneven surface are seen through a rectal speculum or sigmoidoscope from which

blood continually flows or bleeding starts when they are swabbed. The mucosa in these cases is smeared with clear or blood-tinted, thin, non-tenacious mucus, which is more abundant in immediate vicinity of the lesions.

Bacteria or other specific agents responsible for this presumable infectious disease have not been discovered.

Treatment.—The principles involved in the treatment of this do not materially differ from those given for other types of colitis previously described.

Briefly stated, the treatment of hemorrhagic colitis consists in (a) improving hygienic surroundings; (b) suspending work and having the patient remain in bed during attacks of hemorrhage or diarrheal exacerbations; (c) restricting the diet to nutritious non-irritating foods that leave a soft residue; (d) avoiding iced foods and beverages, raw fruits, violent exercise, arduous work, overheating, and worry; (e) employing daily high enemata or colonic irrigations of normal salt, ichthyol, balsam of Peru (5 per cent.), or boric acid (4 per cent.) solution once or twice daily; (f) fulgurating, cauterizing, or making topical applications to lesions through the sigmoidoscope; (g) prescribing antiseptics and astringents to modify fermentation, putrefaction, and diarrhea, an opiate to relieve pain, and administering iron, arsenic, and other tonics to improve the anemic state and build up the general system.

Surgical Treatment.—Sufferers from hemorrhagic colitis rapidly get worse and may die within from six months to three years from loss of blood and exhausting diarrhea, unless the infection is arrested and lesions are healed.

When the above therapeutic measures fail to quickly modify symptoms or cure the patient, *surgical intervention* is imperative and *appendicostomy* (Fig. 1006) or *cecostomy* (Fig. 994) is performed that the entire colon may be irrigated one or more times daily with ichthyol, balsam of Peru 5 per cent., silver nitrate, gr. xv to Oij (1.0–2.000), or other reliable antiseptic stimulating or soothing irrigant that cleanses and tends to heal hemorrhagic lesions.

Irrigations are more effective when position of the patient is changed during treatments and warm are more soothing than cold solutions. When the bowel is irritable, irrigations are alternated with an oil emulsion composed of mineral, olive, or cottonseed oil, Oss (250.0), and bismuth subnitrate, ʒss (15.0), which forms a protective covering over denuded hypersensitive areas when introduced through the appendical or cecal opening.

In 3 of the author's cases where hygienic and medical treatment reinforced by appendicostomy or cecostomy and through-

and-through irrigation did not arrest hemorrhage or control diarrhea cures were obtained by performing *ileostomy* (Fig. 1022) (2), and colonic exclusion—*ileosigmoidostomy* (Fig. 1060) (1), which put the bowel completely at *rest* and prevented feces from irritating infected areas. Colonic irrigation was continued thereafter through the existing appendical and cecal openings.

The author has never found it necessary, but would not hesitate to perform *colectomy* (Fig. 971) should the above method of treatment fail to cure hemorrhagic colitis. *Colostomy* (Fig. 1043) is unsatisfactory in hemorrhagic colitis because of the objectionable artificial anus, and the opening may not be located above the uppermost lesions.

The reader is referred elsewhere for a description of the above-mentioned operations.

The author has successfully treated 11 mild and 7 serious cases of hemorrhagic colitis; the time required to heal the lesions varied from two weeks to six months; ages of the patients varied from six weeks to fifty-four years, the majority being between ten and twenty-five; bleeding occurred frequently and was profuse and anemia was marked in all cases.

Chapter LXXIII

Tuberculosis of the Small Intestine, Colon, and Sigmoid Flexure

TUBERCULAR COLITIS, TUBERCULAR ILEOCOLITIS—TUBERCULAR DIARRHEA

General Remarks.—Tuberculosis of the small intestine, colon, and rectum, which is fairly common, is always difficult to relieve and cure. The disease may attack any segment of or the entire colon or rectum, and occur independently or be complicated by amebic, bacillary, balantidic, luetic, helminthic, or mixed infection colitis, under which conditions and when the patient suffers from another constitutional affection the disease progresses rapidly.

It is known that tubercle bacilli are not *destroyed* by *gastric secretion* or *succus entericus* and that these juices temporarily *attenuate* the organisms, which accounts for the known clinical fact that tuberculosis involves the cecum, colon, and rectum approximately four times more frequently than the upper small intestine; in other words, tubercle bacilli regain their *virulence* by the time they reach the *cecum*, which in 85 per cent. of cases is involved alone or in conjunction with the colon or rectum in cases of intestinal tuberculosis.

Intestinal is a frequent complication of tubercular foci in the lungs, nasopharynx, stomach, or other organs, but is usually secondary to phthisis, where tubercle bacilli have been coughed up and swallowed.

The disease has been encountered from infancy to old age, but is most common between the twentieth and fortieth years and occurs with about equal frequency in either sex.

Bowel tuberculosis is usually caused by *human*, but may be induced by *bovine tubercle bacilli*—typhus bovinus; the former are ordinarily responsible for the disease in *adults* and the latter are said to have occasionally been the cause of infection in *bottle-fed children*.

Tuberculosis of the colon and rectum may be *primary* or *secondary*, but in 100 cases treated by the author infection of the intestine in 75 per cent. of the cases was secondary to the disease

elsewhere, and in this series 70 per cent. of the foci were located in the lungs, larynx, or pharynx.

Primary are commonly encountered in the cecum or at the anus, while *secondary* tubercular lesions are met with anywhere in the intestinal tract, but show a decided preference for the cecum and rectum.

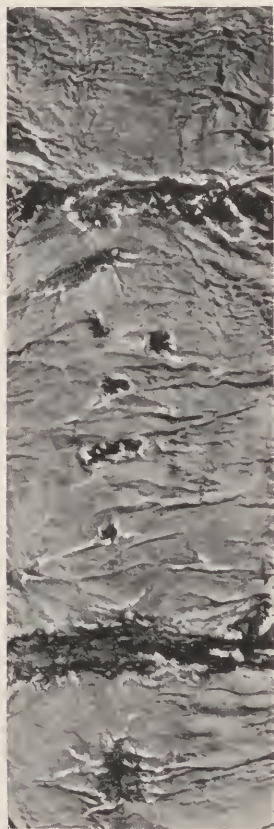


Fig. 761.—Diminutive irregular and extensive girdle tubercular lesions of the ileum and resultant cicatrices.

Tuberculosis seldom if ever occurs in the *duodenum* except as an extension from the stomach, is unusual in the *jejunum* and *upper ileum*, occasionally in the *lower ileum* (Fig. 761), and common in the cecum, colon, and rectum.

There are many reasons to explain the predilection of tuberculosis for the large intestine:

1. Fluidity of feces and more pronounced peristalsis in the small intestine hurry tubercle bacilli through the small bowel before they have an opportunity to cause infection.

2. Gastric juice attenuates bacilli and they do not recover their virulence until they reach the cecum or colon, where they are retained and find lodging places.

3. In the ileocecal region feces have a strong alkaline reaction, while higher up they are acid, which inhibits bacillary activity.

4. In the cecum and ascending colon feces collect and form putty-like or hardened masses, which traumatize the mucosa, produce catarrh, erosions or ulcers, and a mucous discharge, conditions favoring infection by tubercle bacilli.

5. The abundant lymphatic distribution in the ileocecal region favors the development of tuberculosis.

To indicate the association of *intestinal* tuberculosis with the disease elsewhere, frequency of primary and secondary infection, stages of life in which the disease is most common, and relation of sex to the affection the author compiled the statistics incorporated in the tables shown on page 45:

TUBERCULOSIS OF INTESTINE, COLON, SIGMOID FLEXURE 45

AUTHOR'S TABLE OF COLLECTED CASES SHOWING THE FREQUENCY WITH WHICH INTESTINAL COMPLICATES TUBERCULOSIS ELSEWHERE

Name.	Number of tubercular cases.	Percentage complicated with intestinal tuberculosis.
White—Phipps Institute.....	266	45.1
Fenwick and Dodwell.....	883	56.6
Eichorst.....	462	21.9
Heinze.....	1226	51.0
Eisenhardt—by Crowder.....	1000	56.6
Maylard—collected.....	290	40.7 (children)
Zahn—Osler.....	Number not stated.	63.21
Grosser—Osler.....	Number not stated.	47.0
Baginsky.....	963	All intestinal tuberculosis secondary.
Honing—Cornet.....	Number not stated.	70.0
Weigert and Orth—Cornet.....	Number not stated.	90.0
Total.....	5090	49.27

AUTHOR'S TABLE OF COLLECTED CASES SHOWING THE FREQUENCY OF PRIMARY TUBERCULOSIS

Name.	Number of cases.	Percentage of primary intestinal tuberculosis.
Biedert.....	3,104—tuberculous patients.	0.5 —children
Harbitz—collected from English sources.....	1,458	19.0 —children
Ipsen.....	Number not stated.	17.0 —children
Orth.....	44—intestinal tuberculosis.	10.0 —children
Eisenhardt.....	1,000	0.1
Zahn—Osler.....	Number not stated.	2.27
Cierchanowski—Osler.....	13,203—general autopsies.	1.04
Frerichs.....	208—intestinal tuberculosis.	0.5
Bonome.....	769—tuberculous autopsies.	16.4
Bovaird:		
American autopsies.....	369—intestinal tuberculosis.	1.33
German autopsies.....	236—intestinal tuberculosis.	0.4
French autopsies.....	128—intestinal tuberculosis.	
English autopsies.....	748—intestinal tuberculosis.	18.0
Baginsky.....	963—tuberculous autopsies.	
Wagner.....	410—tuberculous autopsies.	4.88
Eisenbach.....	27—intestinal tuberculosis.	29.6
Herxheimer.....	58—intestinal tuberculosis.	1.8
Total.....	22,725	7.22

CROWDER'S TABLE

Age.	Male.	Female.	Total.
1 to 10.....	0	0	0
11 to 20.....	4	7	11
21 to 30.....	10	14	24
31 to 40.....	19	10	29
41 to 50.....	3	6	9
51 to 60.....	3	5	8

ETIOLOGY

Intestinal tuberculosis may be induced by *human* or *bovine*—*typhus bovinus*—*tubercle bacilli*, the former causing the disease in about 95 and the latter in 5 per cent. of cases. Bovine infection comes from consumed meat obtained from tubercular animals and occurs more frequently in children than adults.

As previously stated, human tubercle bacilli are nearly always responsible for intestinal tuberculosis, and the disease here is secondary to phthisis or infection of the throat in 70 per cent. of cases.

Tubercle bacilli gain access to the intestine through the inhalation of contaminated dust, being carried to the mouth by the fingers, dishes, pencils, cigarette holders, etc., partaking of milk, cheese, butter, meat, and other infected foods, scratching the anus, and using unsterilized syringes or instruments employed by patients suffering from rectocolonic tuberculosis.

It is claimed tubercle bacilli at times penetrate the normal bowel, but usually they enter lacteals or capillaries through abrasions in the mucosa, where epithelium has been destroyed by trauma incident to irritating or hardened feces or inflammatory lesions.

Ordinarily tubercular infection originates *inside* the bowel, but sometimes starts in the perianal skin, peritoneal tunic, adjacent lymph-nodes, or involves the intestine through extension of tubercular lesions in neighboring organs—ovaries, prostate, bladder, etc.

Classification.—It is difficult to group intestinal tubercular lesions because of their varying character, occasional blending of one type with another, part played by mixed infection, virulence of the disease in different cases, and modification of the inflammatory process by complicating local and constitutional affections.

The author groups tubercular lesions of the small and large intestine into the following types:

1. Superficial ulcerative—enteric.
2. Deep ulcerative—enteroperitoneal.
3. Hyperplastic—hypertrophic—neoplastic.
4. Fibrosclerotic.
5. Glandular.
6. Peritoneal.
7. Miliary—general tuberculosis.

Dissimilar lesions are occasionally encountered in the same or different segments of the bowel, and some types of disease are met with more frequently than others.

In a large series, including 100 cases of intestinal tuberculosis

previously published by the author,¹ different types of lesions were encountered as follows: *superficial ulcerative* 80, *deep ulcerative* 8, *hyperplastic* 4, *peritoneal* 3, *glandular* 2, *fibroplastic* 2, and *miliary* 1 per cent.

PATHOLOGY

Ulcerative occurs more often than all other forms of bowel tuberculosis, and the *superficial* is met with very much more frequently than the *deep* ulcerative type.

Superficial Ulcerative—Enteric Type.—This form of the disease (Fig. 762) encountered throughout the intestinal tract shows a predilection for the lower ileum, cecum, and ascending colon—segments of gut where lymphoid tissue, solitary follicles and Peyer's patches predominate, and ulcerated areas are more numerous and extensive opposite the mesenteric attachment or site of Peyer's patches.

Shortly following infection solitary glands or segments of Peyer's patches appear prominent, owing to distention of follicles by the inflammatory process and tubercular tissue. Later, because of impaired nutrition—necrosis—or *caseation*, diminutive lesions form; ulcerated areas rapidly multiply and enlarge through coalescing of lesions the result of irritating toxins, formation of new tubercles that break down, mixed infection, and endo-arteritis, causing necrosis, in consequence of which long narrow or broad encircling ulcers form (Fig. 763).

Tubercle bacilli inaugurate lesions, but mixed infection partici-



Fig. 762.—Numerous small and large round tubercular ulcers of the colon (Army Med. Museum).

¹ Diarrheal, Inflammatory, and Parasitic Gastro-intestinal Diseases, 1915.

pated in by pathogenic and saprophytic micro-organisms together with irritation incident to feces aggravate them as other types of tubercular ulcers, causing extension and undermining of their edges, but enteric lesions seldom penetrate deeper than the mucosa; ulcerated areas may heal at one point and break down at another, but, as a rule, they show no tendency to improve unless properly treated.

Superficial—enteric—tubercular ulcers are grayish in color, have a greasy appearance, macerated base, smooth or irregular, soft or indurated, and swollen, edematous, undermined edges in which are seen tubercles sound or undergoing caseation, and these lesions may be single or multiple or circular or elongated in shape.

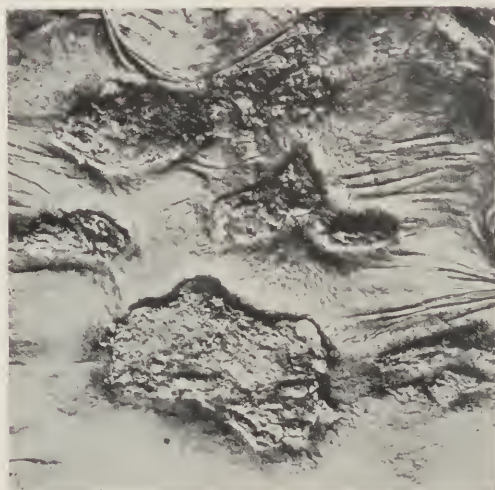


Fig. 763.—Colonic tubercular ulceration. Note number and size of lesions, their lack of tendency toward girdle formation, and intervening cicatrices, which indicate the tubercular process is being cured.

They are designated *girdle* ulcers because they usually follow vessels and extend transversely, encircling the gut (Fig. 764).

Perforation is rare, but the inflammatory process is reflected in the *peritoneum* by *dark spots* of exudates at the base of lesions, and the disease may be complicated by agglutination of intestinal loops or thinning of gut wall, which is always fragile. Usually bleeding is slight because only diminutive vessels are involved, but is profuse when larger arterioles are eroded.

Deep Ulcerative—Enteroperitoneal—Type.—This is the most serious form (Figs. 764) of intestinal tuberculosis, because it progresses rapidly and is difficult or impossible to arrest, since tubercular foci involve mucosa and serosa simultaneously and caseation

occurs early, owing to the virulence of infection and activity of pathogenic organisms.

The tubercular process plus mixed infection soon causes toxemia, imperfect digestion, constitutional manifestations, persistent diarrhea, and extensive destruction of mucosa and deeper bowel tunics; enteroperitoneal ulceration frequently leads to perforation, hemorrhage (6 to 8 per cent.), peritonitis, abscess, pyostercoral fistula or formation of stricture, adhesions, angulation, or papillomatous excrescences; these like other tubercular lesions tend to encircle the gut.

Infection may originate in peritoneum, adjacent lymph-nodes, or other organs, but usually starts in mucosa and extends outward, involving the gut wall by contiguity through lymph-vessels and

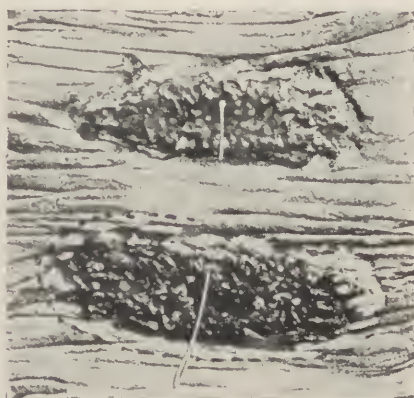


Fig. 764.—Large encircling girdle tubercular ulceration of colon complicated by mixed infection. Note undermined edges and probe passed through fistula connecting the lesions.

nodes, and the destructive process may be limited to one or involve all segments of the large intestine.

The author observed 3 cases of deep ulceration confined to the small gut which was most pronounced in the lower ileum. Agglutination of the bowel with the appendix, intestinal loops, or neighboring organs is usual and mesenteric glands often enlarged, the result of inflammatory changes or tubercular deposits, in which case nodes are partially or completely destroyed by caseation or suppuration in glands.

Frequently the tubercular process becomes generalized when whitish *miliary* tubercles whole or undergoing caseation are seen dotting the intestinal peritoneum (Fig. 768), which is congested, and with other tunics tears easily on tension.

Hyperplastic—Hypertrophic—Neoplastic—Type.—The neo-

plastic or tumor-forming variety of tuberculosis (Fig. 765) occurs more frequently than supposed, may be induced by human or bovine bacilli, is primary or secondary, seldom induces diarrhea, loss of weight, or sallow complexion, and is often mistaken for chronic fecal impaction or a new growth—particularly cancer. Results are usually good when the mass is extirpated; the author in this way effected a cure in 2 cases previously diagnosed as incurable cancer following laparotomy.

Hyperplastic tuberculosis occurs in children or adults, but is most common in the third decade, met with in about equal fre-

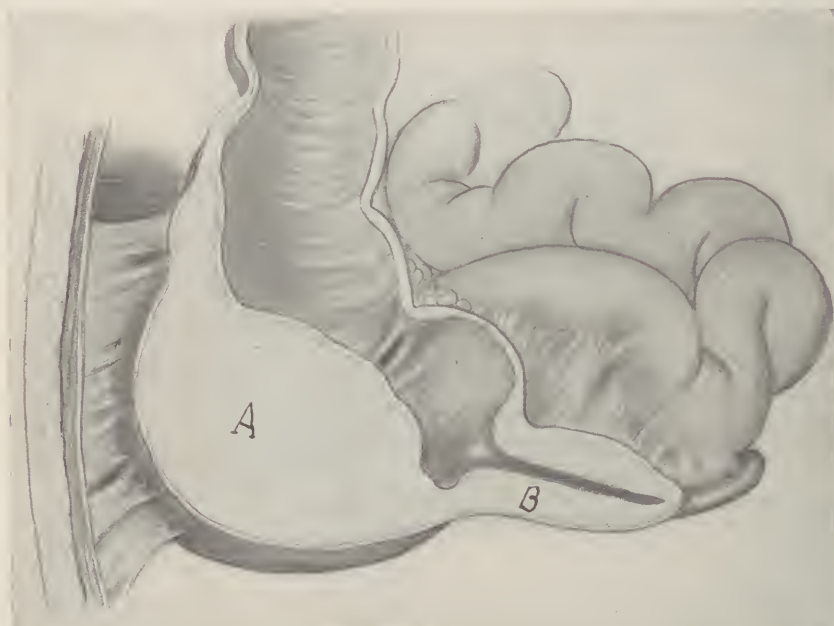


Fig. 765.—Neoplastic—hypertrophic tuberculosis of (A) the cecum and (B) the appendix that induced alternating constipation and diarrhea. (After author's case.)

quency in men and women, has been found in different intestinal segments, but shows a predilection for the cecum, ascending colon, and rectum.

In 100 cases collected by Mummery neoplasms were distributed as follows:

Sigmoid flexure.....	6
Cecum.....	48
Cecum and ascending colon.....	39
Whole colon.....	4
Cecum, ascending and transverse colon.....	3
Total.....	100

Neoplastic is usually independent, but has been associated with other varieties of intestinal tuberculosis, and neoplasms are usually single and located at the *ileocecal angle*, but have been multiple and situated in different colonic segments. The author possesses an excised specimen (Fig. 490) that involved the rectum and lower sigmoid.

Hyperplastic tuberculosis, often unassociated with tubercular lesions elsewhere, develops slowly, and may exist from six months to three years before the tumor attains sufficient size to occlude the colon and induce serious local and constitutional manifestations. These neoplasms are sharply defined, firm, smooth, oval, or irregular in shape, fixed or slightly movable, easily seen or palpated through the abdominal wall, and limited to one side or involve the entire circumference of the bowel, due to fibroplastic deposits within and without the gut. Neoplastic tubercular neoplasms are encased in a thick elastic fibro-adipose sheath, separable from the bowel by careful dissection, and upon section tumors are resistant to knife, grayish-white in color, resemble cartilage, and gut wall varies from $\frac{1}{2}$ to 1 inch (12.70 mm.—2.54 cm.) or more in thickness. The involved bowel is rigid, non-collapsible, and obstructed by annular or tubular stricture that develops slowly, causing gradual obstruction.

Ordinarily mucosa is dense, pale, smooth, fixed, and devoid of tubercles, but in rare instances is ulcerated or dotted with caseating areas or papillomatous growths, the latter being a frequent complication.

Hyperplastic tuberculosis develops from *submucosa*, is characterized by round-celled infiltration, the neoplastic process extends in either direction until a tumor varying from egg to orange size or larger forms. When the mass is very large it is sometimes composed of hyperplastic bowel, appendix, intestinal coils, and lymph-nodes welded together by exudates or adhesions.

The peritoneal tunic is but slightly changed and the appendix may be healthy or tubercular, though in one of the author's cases it had undergone hyperplastic changes and was four times the normal size (Fig. 765).

Ileocecal *adenopathy* is usual and limited to adjacent or extends to distant lymph-nodes—mesenteric, retroperitoneal glands—which undergo calcification or caseate, break down, and form abscesses. The author has resected the ileocolic angle (Fig. 969), cecum, colon, and sigmoid 6 times for neoplastic tubercular tumors, with 2 deaths and 4 permanent recoveries.

Fibrosclerotic Type.—This variety, which possesses many

characteristics of and is frequently mistaken for hyperplastic tuberculosis, is seldom complicated by ulceration and diarrhea, but obstruction is marked. Patients thus afflicted are not typically tubercular in appearance, since the throat and lungs are seldom involved.

In this affection the bowel is converted into a firm resisting tube—*gas-pipe intestine*—through the formation of fibrous tissue resulting from the action of toxins, tubercle bacilli, or other pathogenic micro-organisms working alone or in conjunction. The mucosa is immobile, grayish in color, and thrown into longitudinal or concentric rings through contraction of the outer tunics and not a result of cicatricial tissue from healed ulcers.

Glandular Type.—This is not so important as previously described forms of tuberculosis because of its rareness and occasional dissociation with intestinal lesions.

Mesenteric, adjacent, and distant lymph-nodes may be primarily or secondarily involved in different types of bowel tuberculosis. One or many glands enlarge, forming a conglomerated mass, sometimes mistaken for fecal impaction or cancer. Lymph-nodes sometimes are swollen, the result of other colonic infections, but when tubercular they may caseate or spontaneously reduce in size (Fig. 770).

Peritoneal Type.—The serosa is usually involved in colonic tuberculosis (Fig. 766) due to active tubercle bacilli, mixed infection, or extension of lesions from within the bowel. Murphy groups peritoneal tuberculosis as follows:

1. Disseminated, exudative, miliary, non-confluent, or serous—ascitic—variety.

2. Nodular, ulcerative, or perforative (Fig. 768).

3. Adhesive, fibroplastic—cystic or obliterative.

4. Suppurative, circumscribed, or general mixed infection.

In 107 cases investigated by Phillips peritoneal was associated with lung in 90, pleural 60, and intestinal tuberculosis in 80 instances.

Miliary Type.—Miliary—general (Fig. 768)—tuberculosis is always serious because generalized, and it involves the intestine and other organs and structures throughout the body, and is usually secondary to localized foci.

In this form of tuberculosis, particularly when the intestine is involved, the peritoneum and omentum present a speckled appearance (Fig. 768), produced by projecting, smooth or caseating, white or yellowish-tinted tubercles, which upon the mucous and skin surfaces of the anorectal region appear in patches and soon

break down to form superficial cup-shaped ulcers. These lesions may extend over a considerable area individually or by coalescence, but are not inclined to attack the deeper structure, like other forms of tuberculosis.

The prognosis of intestinal miliary tuberculosis is unfavorable because it is secondary to and rarely develops until after the disease has become well established elsewhere, and the patient is debilitated and unable to withstand ravages of the spreading tubercular process.

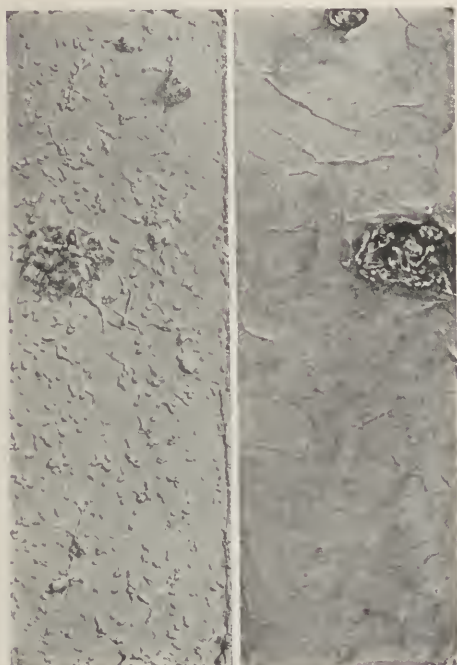


Fig. 766.—Enteroperitoneal tuberculosis. Left peritoneal and right mucous surface of the gut (Army Med. Museum).



Fig. 767.—Tubercular ulceration of the appendix (Army Med. Museum).

Tuberculosis of the Appendix.—All forms of bowel tuberculosis show a predilection for the appendix (Fig. 767) because of its structure, liability to catarrh, inflamed and contained adenoid tissue, lymph-follicles, and pathogenic bacteria, imperfect drainage, and connection with the cecum, which is usually involved.

The appendix has been tubercular in approximately 10 per cent. of the author's cases of intestinal tuberculosis.

Anorectal Tuberculosis.—Anorectal tuberculosis is common and the infection is more difficult to control here than in the small

or large intestine and is frequently complicated by abscess and fistula. Mixed infection plays an important part in rectosigmoidal tuberculosis and persistent diarrhea, with an abundance of pus, blood, and mucus in the stools complicates the disease. A full description of anorectal tuberculosis has been given in Chapter XLI, to which the reader is referred.

Carcinomatous grafting is not uncommon upon intestinal tubercular lesions or scars from healed wounds probably because of irritation to the mucosa induced by pouring over it the acrid discharge.

SYMPTOMS

Dominant manifestations of tubercular enterocolitis and colitis are persistent diarrhea, intermittent abdominal tenderness, pain, and cramps, and presence of mucus, pus, and some blood in the stools; symptoms are slight in the beginning and increase in severity as disease progresses.

Small intestinal is rare and causes less distress than colonic and rectal tuberculosis, where tubercle bacilli are more virulent and mixed infection caused by pathogenic and saprophytic bacteria is troublesome. Since bowel is usually secondary to lung or throat infection symptoms of these conditions are confused with intestinal manifestations; these patients have a sallow complexion, outstanding ears, cough, and suffer from hemoptysis, rise in evening temperature, increased pulse-rate, hectic flush, night-sweats, loss in weight, anorexia, poor digestion, malaise, furred tongue, and other symptoms of pulmonary tuberculosis and colitis.

Diarrhea gets progressively worse from the beginning, and movements, few and soft at first, later become frequent and fluid and intermingled with pus and blood as inflammatory and ulcerative lesions extend; when tubercular colitis is fully established evacuations occur chiefly at *night*, when the condition is designated *diarrhea nocturna*. Occasionally diarrhea is intermittent, becoming active following an attack of abdominal cramps and gas distention, in which cases stools have an offensive odor.

Hemorrhage is slight or considerable, depending on the size of vessels involved, and blood is evacuated in dark brown clots—*coffee-ground stools*—when caused by *high*, and *bright red* in color when due to lesions in the *lower* sigmoid flexure or rectum. The amount of pus, blood, and mucus in the movements and diarrhea increase or decrease with extension or healing of the ulcerative process.

Tenesmus is marked when diarrhea is persistent and the rectum is extensively involved, the amount of *tissue debris* varies with viru-

lence of infection; pain and tenderness are more troublesome in ileocolitis than in tubercular colitis or proctitis, and with other



Fig. 768.—Peritoneal tuberculosis of the small intestine.

manifestations are aggravated by exacerbations during which vermicular bowel movements are observed.

Perforation with peritonitis is rare and usually encountered in deep ulcerative enteroperitoneal type, but may complicate any form of intestinal tuberculosis; in such cases gas distention, abdominal tenderness, and muscular rigidity are marked, and the patient has the facial expression observed in this condition.

The symptoms of *enteroperitoneal* (Fig. 766)—deep ulcerative—progress more rapidly than those of *superficial*, *fibrosclerotic*, *glandular*, and *peritoneal* types of bowel tuberculosis unless quickly arrested, because the disease working both from within and without the gut causes rapid destruction of tissue, leading to toxemia, exhaustion, and massing together of the colon and loops of small intestine, perforation, continuous diarrhea, and other serious or fatal complications.

Peritoneal tuberculosis (Fig. 768) may be insidious or occur quickly, the result of extension, and is usually accompanied by the same symptoms as other types of bowel or those of peritoneal tuberculosis when an ulcer penetrates the intestinal wall.

Hyperplastic—neoplastic—tuberculosis seldom induces distressing manifestations early, as the disease requires from months to two years to fully develop, after which it produces manifestations similar to those induced by stricture, new growths, and other obstructing lesions. Unless complicated by phthisis or tubercular foci elsewhere there is no loss of weight, sallow complexion, obstinate diarrhea or pus, blood,

or mucus in the stools, and prior to occlusion the patient complains chiefly of digestive disturbances, slight tympanites, alternating loose and constipated evacuations, and does not look tubercular; because of the absence of distressing symptoms seriousness of the patient's condition is not suspected until he develops obstructive diarrhea or the tumor is apparent.

Perforation (Fig. 769) rarely complicates hypertrophic tuberculosis, but meteorism, gurgling, and splashing sounds are detected at the ileocolic angle or proximate to the growth, which is easily defined by palpation. The chief manifestations of hyperplastic

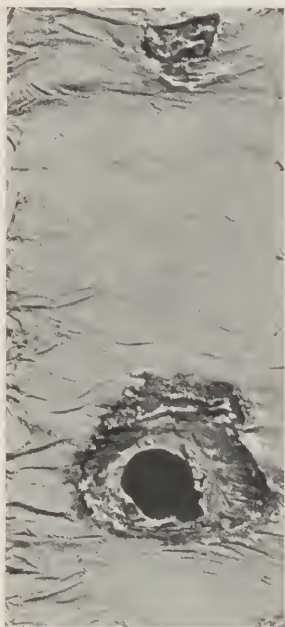


Fig. 769.—Perforating tubercular ulcer of the intestine secondary to pulmonary lesions.

tuberculosis resemble those induced by cancer or other tumor causing obstruction.

The symptomatology is practically the same in *fibrosclerotic* and *hypertrophic* tuberculosis, constipation alternating with diarrhea and later frequent fluid movements when obstruction is almost complete, tympanites, occasional colic, and feeling as if the bowel was blocked at a certain point.



Fig. 770.—Tubercular enlargement of mesenteric lymph-nodes (Army Med. Museum).

Glandular tuberculosis (Fig. 770) produces manifestations similar to those of the superficial ulcerative type, except gas distention is pronounced, diarrhea is not persistent, there is little blood and mucus in feces, and lymph-nodes, which are enlarged to a greater degree, are often palpable.

Complications and Sequelæ of Intestinal Tuberculosis.—Of the slight and serious complications and sequelæ, the following are most important: *stricture*, *peritonitis* accompanying or without perforation, *adhesions*, *kinks*, *twists*, *abdominal abscesses* and *fistulæ*,

generalization of the infection—miliary tuberculosis and *carcinomatous grafting* upon the tubercular process.

Stricture, single or multiple, annular or tubular, is a frequent complication of intestinal tuberculosis wherever located, and in the author's 20 cases of tubercular intestinal stenoses obstruction occurred as follows:

Ileum.....	2
Ileocecal region.....	2
Transverse colon.....	1
Descending colon.....	1
Sigmoid flexure.....	2
Rectosigmoidal juncture.....	2
Rectum—ampulla, 6; anal canal, 2.....	8
Anus.....	2
Total.....	20

When the result of *superficial ulcerative*—enteric, *deep ulcerative*—enteroperitoneal or *peritoneal* strictures are of the *annular* or *tubular* type; when stenosis is due to the *hyperplastic* variety the bowel is blocked by a *tumor* mass, and when occlusion is induced by *fibrosclerotic* tuberculosis several inches or feet of the bowel is constricted by fibrous deposits, so-called *gas-pipe* intestine.



Fig. 771.—Tubercular involvement of mesenteric lymph-nodes (Carnegie Laboratory).

Ulceration and dilation of the gut is observed proximal to the stricture in all cases, and the patient exhibits usual manifestations of intestinal obstruction. Tubercular strictures are more common in the rectum than higher up.

Tubercular peritonitis complicating intestinal tuberculosis shows the usual symptoms of acute inflammation of the serosa when due to a perforating ulcer, but when there is *typical peritoneal infection* abdominal symptoms are vague, come on insidiously, and there is more or less abdominal distention, pain, muscular rigidity, and uneasiness, which increases as the disease progresses, and when associated with *miliary* lesions the patient displays manifestations observed in the last stages of pulmonary tuberculosis.

Intestinal *adhesions*, *kinks*, and *twists*, causing constipation, backing up of gas, and other symptoms of chronic intestinal obstruction, are frequent complications of bowel tuberculosis.

Abdominal *abscesses* and ordinary or fecal *fistulæ* may be induced by superficial complicated by mixed infection, but *deep ulcerative* tubercular colitis is more frequently responsible for these conditions.

When there is an abscess the patient complains of chilly sensations, high temperature, localized pain, and other manifestations of sepsis until pus is evacuated, which causes acute peritonitis when it enters the abdomen. Distressing symptoms subside when fistula forms and pus escapes; in the presence of *fecal fistula* the patient complains mainly of the odor and soiling of clothing and the skin by feces.

A further discussion of miliary tuberculosis and carcinomatous grafting on the tubercular process in cases of intestinal tuberculosis is unnecessary, having received due consideration elsewhere.

DIAGNOSIS

It is difficult to differentiate between catarrhal, amebic, bacillary, balantidic, and tubercular colitis when the disease is fully established and the patient suffers from loss of weight, toxemia, indigestion, persistent diarrhea, mucus, pus, and blood in evacuations, abdominal soreness, and more or less rectal tenesmus, and it is not always easy to distinguish between hyperplastic and fibrosclerotic obstructing tubercular lesions and chronic fecal impaction, adenomata, carcinomata, and sarcomata extensively involving the large or small intestine.

Intestinal are nearly always secondary to tubercular foci elsewhere—throat or lungs—and the patient usually exhibits characteristics of the tubercular subject—sallow complexion, emaciation, digestive disturbances, afternoon temperature, night-sweats, anemia, anorexia, and sometimes hemoptysis.

These manifestations, prominent in *superficial* and *deep ulcerative* types, are absent or less marked in cases of *hyperplastic* and

fibrosclerotic intestinal tuberculosis, which may be primarily induced by human or bovine bacilli and develop slowly without causing distressing manifestations until the neoplasm has attained considerable size or the gut has been occluded by the inflammatory, ulcerative, or fibrotic process.

Tuberculin reaction tests help determine if the patient is tubercular, but do not indicate part of the body in which foci are located. Examination of lungs, throat, bladder, and prostate for tubercular lesions is imperative because they are often directly or indirectly responsible for bowel involvement. Digital exploration and inspection of the sigmoid flexure and rectum through a proctosigmoidoscope enables the examiner to ascertain the type of lesion and degree to which it has progressed; but a positive diagnosis of intestinal tuberculosis is accomplished only by finding *tubercle bacilli* in feces, the discharge, tissue removed, or in sputum of patients evidently suffering from *colitis* and tubercular throat or lung involvement.

Feces are examined microscopically for tubercle bacilli, *Entamoeba histolytica*, *Balantidium coli*, *Shiga bacilli*, and segments of worms and their oval organisms and parasites known to have caused ulcerative colitis and dysenteric manifestations of inflammatory tumors.

The author does not underestimate the value of tuberculin and other tests, opsonic index reactions, and blood analysis, but relies chiefly on subjective and objective symptoms and discovering of tubercle bacilli in the sputum or stools.

Superficial (Fig. 762) is diagnosed by shallowness of lesions, mildness of manifestations, slightness of diarrhea, moderation of constitutional symptoms, and *deep ulcerative* (Fig. 764) colitis by enormous destruction of tissue—as seen through sigmoidoscope—aggravated diarrhea, considerable amount of pus, blood, and mucus in the stools, rapid loss in weight, marked toxemia, and profound systemic disturbances.

These types need not be confused with *neoplastic* or *fibrosclerotic* tuberculosis, which are seldom complicated by serious lung involvement, colitis, or dangerous constitutional disturbances and distress, the patient complaining chiefly of obstructive manifestations caused by the obstructing tumor (Fig. 765) or strictured segment of gut, which are easily differentiated from each other by palpation and inspection through the sigmoidoscope.

Hyperplastic tuberculosis is easily diagnosed because it develops slowly without causing serious local or general manifestations, cachexia, or loss of weight, and the neoplasm which shows a predi-

lection for the cecum is large, smooth, elastic, and can be defined without difficulty by palpation when not visible. By compressing the swelling between thumb and fingers one differentiates between *neoplastic*, *tubercular* (Fig. 765), and *fecal tumors* (Fig. 938), since the latter are indentable and the former are not.

Hyperplastic tubercular masses are most frequently mistaken for cancer, and the author has arranged the accompanying table which shows the principal differentiating points between these neoplasms:

AUTHOR'S DIFFERENTIAL DIAGNOSIS BETWEEN ILEOCECAL HYPER-PLASTIC TUBERCULOSIS AND CANCER

Hyperplastic tuberculosis.		Carcinoma.
Age.....	Twenty to forty—principally third decade.	Forty to sixty. Childhood very rare.
Onset and progress.....	Slow.	Rapid.
Duration.....	Two to three years.	Four to ten months.
Pain.....	Usually slight.	More frequent and marked.
Cachexia.....	Absent.	Present.
Emaciation.....	Slow and slight.	Rapid and pronounced.
Digestive disturbances.....	Early and marked.	Late manifestation.
Fever.....	Common.	Rare.
Obstruction.....	Late and partial.	Early and marked.
Abdominal tenderness.....	More or less.	Unusual.
Gurgling and splashing.....	Present.	Rare.
Peristalsis.....	Marked.	Slight.
Position.....	Cecum drawn upward.	Cecum normal position.
Location.....	Ileocecal region.	Anywhere in the colon, particularly at the flexures.
Mobility.....	Fixed.	Slightly movable.
Intestine palpable.....	Usually.	Rarely.
Abscess and fistula.....	Occasional.	Very rare.
Hemorrhage.....	Very rare.	More frequent.
Blood and pus in stools.....	Occasional.	Always.
Bacilli in stools.....	Tubercle occasionally.	Absent.
Fetid odor to stools.....	Slight.	Characteristically foul.
Peritonitis—circumscribed.....	Practically always.	Occasional.
Tuberculin reaction.....	Usually positive.	Absent.
Leukocytosis.....	Leukopenia frequent.	Moderate.
Ehrlich's diazo reaction.....	Frequently present.	Absent.
Involvement of other organs.....	Frequent—lungs, throat.	Infrequent—liver.
Adjacent gut.....	Thickened.	Normal.
Mesentery and peritoneum.....	Extensively involved.	Sometimes slightly.
Tumor characteristics.....	Broad, oval, and smooth.	More nodular and firm.
Bowel wall.....	Subserosa especially involved.	Submucosa.
Retrogressive changes.....	Rarely breaks down.	Degenerates and forms crater-like ulcers.
Microscopically.....	Giant-cells, tubercle bacilli.	Characteristic tumor cells.

TREATMENT

Routine measures are impracticable in this class of cases because intestinal tuberculosis may exist independently or be

associated with phthisis or foci elsewhere, and owing to the varying types, virulence, duration, and complications of tuberculosis affecting different segments of the gut and predominance of certain symptoms. Occasionally the disease is primarily in the bowel, but usually secondary to lung, throat, or joint involvement, and under such circumstances the treatment is necessarily *local* or *general*.

Therapeutic measures employed to relieve and cure intestinal tuberculosis have been discussed under the following headings: *prophylactic measures, agents for improving general health, medicinal treatment, serotherapy, irrigating treatment, topical applications, and surgical treatment.*

Prophylaxis against intestinal infection in persons having inherited a weakened constitution or a predisposition for tuberculosis consists in having them avoid sedentary occupations, poorly ventilated and rooms occupied by tubercular subjects and unhygienic surroundings, exercise in the open air, consume an abundance of milk and nourishing food, and indulge in mild gymnastics that increase chest expansion.

Measures for improving general health are important, and this is most quickly accomplished by encouraging the patient, having him take a tonic, rest during crises, sleep in the open, avoid exposure, dress according to weather, and consume at short intervals an abundance of milk, cream, eggs, and a reasonable amount of meat.

These patients are permitted to do a reasonable amount of work and indulge in moderate outdoor exercise when intestinal tuberculosis with or without lung involvement is mild, but *rest* in the house or, preferably, bed and a restricted diet are advisable in neglected cases and during exacerbations of lung or intestinal tuberculosis. Most patients do very well in sanatoria situated at a suitable altitude (800 to 1000 feet) when pulmonary lesions are aggravating the intestinal condition.

Regarding *diet* it may be said that alcoholic beverages and foods that cause excessive fermentation and putrefaction or leave a coarse, irritating residue are prohibited, and a liberal nourishing mixed diet is permitted, as these patients lose weight when restricted to fluids.

Medicinal treatment is useful for alleviating coughing, insomnia, nervousness, digestive disturbances, pain, cramps, diarrhea, rectal tenesmus, controlling hemorrhage, deodorizing stools, and strengthening the patient, but is not curative, since a *specific* for intestinal or other forms of tuberculosis has not yet been discovered.

Tonics intelligently prescribed are helpful to build up the patient, relieve anemia, and correct neurogenic disturbances, of

which the following have proved satisfactory in the author's hands when administered sufficiently often in proper dosage: Russell's emulsion, \mathfrak{z} ss (15 gm.), three times daily; reduced iron, gr. ij (0.12); Blaud's pills, 1 to 2; Fowler's solution, \mathfrak{m} ij to x (1.12–0.60); creosote, \mathfrak{m} j to iij (0.06–0.18); guaiacol carbonate, gr. x to xv (0.60–1.0), or injections of succinamid of mercury, gr. $\frac{1}{5}$ (0.013), or cacodylate of soda, gr. j (0.06), alone or in conjunction. Acid fermentation accompanied by the loss of lime is combated by administering mineral waters containing lime salts.

Antiseptics and soothing remedies are useful when fermentation and putrefaction are troublesome, and the intestine is irritable because of their bactericidal tendencies and quieting action upon inflamed mucosa, but they are not sufficiently powerful to seriously attenuate or destroy tubercle bacilli.

Drugs listed below are as reliable for the purposes as any administered according to requirements: Calcium, gr. x to xxx (0.60–1.30); pulverized chalk, gr. xv to xl (1.0–4.0); charcoal, gr. xv to xxx (1.0–2.0); methylene-blue, gr. iss (0.09), with lactose; calomel, gr. iss to ij (0.03–0.12), in broken doses; beta-naphthol, gr. iij (0.18); creosote, \mathfrak{m} ij (0.12); salol, gr. x (0.60); bismuth subnitrate and carbonate, gr. x to xx (0.60–1.30); boric acid, gr. v (0.30); benzoate of soda, gr. x to xv (0.60–1.0), and catechu, gr. viij (0.50), three times daily.

Opium by mouth, hypodermically, or in suppositories three times daily is the remedy *par excellence* in tubercular colitis, because it quiets the patient, overcomes insomnia, diminishes fluidity and frequency of evacuations, and controls pain and cramps when prescribed in the following form and dosage: pulveris, gr. iss (0.09); camphorated tincture of opium, \mathfrak{z} j (4.0); Dover's powder, gr. x (0.06); morphin, gr. $\frac{1}{4}$ (0.016), and heroin, gr. $\frac{1}{10}$ (0.006).

Belladonna, gr. $\frac{1}{4}$ (0.016), is combined with an opiate when enterospasm and abdominal rigidity are troublesome, or with one of the below-mentioned styptic or astringent remedies when diarrhea is persistent.

Astringent and *styptic agents* are resorted to alone or in combination with the above remedies when hemorrhage is alarming, discharges are abundant, and stools are exhaustingly frequent. Of many drugs employed under these circumstances the following are most reliable: tannic or gallic acid, gr. x (0.60); tannalbin, gr. xv (1.0); bismuth subgallate, gr. xx (1.30), and silver nitrate, gr. $\frac{1}{60}$ (0.001), in water every two hours.

An occasional dose of emperin, gr. x (0.60), repeated if necessary, is comforting when the patient is slightly feverish and com-

plaints of headache. Night-sweats are controlled by improving hygienic surroundings, using the sleeping porch, forced feeding, and administering tincture of belladonna, mv (0.30), or atropin, gr. $\frac{1}{100}$ (0.0006), two or three times daily.

Tubercular subjects have a peculiarly sensitive gastro-intestinal tract, and drugs prescribed for any purpose must be discontinued when they cause digestive disturbances and aggravate diarrhea.

Serotherapy.—Sera, including Koch's old and new tuberculins, bacillary emulsions, and vaccine preparations, possibly help prevent,

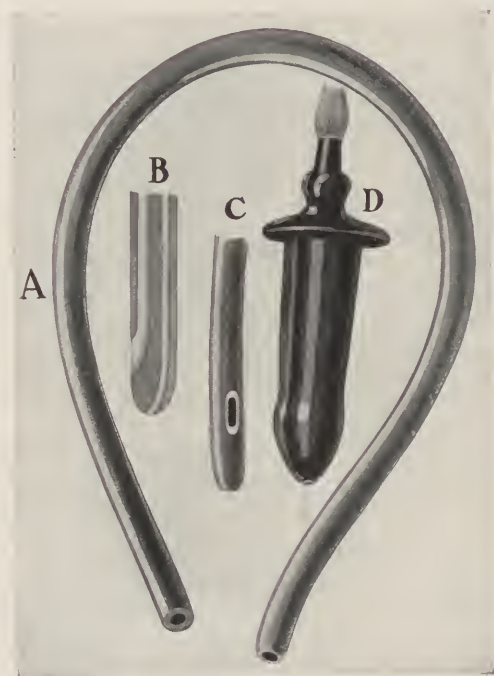


Fig. 772.—Types of enema tubes useful in the irrigating treatment of rectocolonic ulceration: *A*, Ordinary colon tube with opening in end; *B*, Murray's double-flow tube; *C*, type with eye in side; *D*, hard-rubber anal irrigator.

but are not curative in cases of intestinal tuberculosis secondary to phthisis or tubercular foci elsewhere, and the author's experience with them in this class of cases seldom warrants their employment.

Irrigating Treatment.—High saline colonic enemata are helpful, but colonic irrigation (Fig. 772) is more effective when a two-way metal, hard-rubber, or soft colon tube (Fig. 772, *B*) and medicated solutions are employed, and still better results are obtained when the patient is placed in a suitable posture and lavage follows evacuation of feces by an injection or laxative.

Irrigation intelligently carried out is the most satisfactory therapeutic measure employed in the treatment of rectocolonic tuberculosis, but relief or cure is obtained more quickly when bowel flushing is used in conjunction with the hygienic, dietetic, and medical treatment, and topical applications to persistent ulcers located in the sigmoid flexure and rectum.

As in other types of colitis, improvement rapidly follows the inauguration of *medicated enteroclysis*, for *stools* diminish in frequency, the discharge lessens, bleeding ceases, digestion improves, and the patient rapidly gains in weight and feels greatly encouraged.

Irrigants used in the treatment of tubercular are practically the same as for other types of colitis. The chief benefit derived from irrigating solutions is attributable to their *mechanical* action in cleansing inflamed mucosa and ulcerated areas of bacteria, toxins, acrid discharge, putrefying food remnants, and feces. Cold (55° to 75° F.) induce *discomfort* and enterospasm, while hot solutions (100° to 115° F.) *soothe* the gut and diminish soreness.

When stools are numerous, bleeding profuse, and the patient is being exhausted by diarrhea, irrigations of silver nitrate, gr. xxx, in water Oij are administered three times weekly, after which the bowel is washed out with normal salt solution to remove excess of silver. When evacuations are reduced and patient feels better one of the following milder solutions is substituted for silver: boric acid 3, ichthyol, balsam of Peru 2, permanganate of potassium 1, or argyrol 5 per cent.; the strength of these irrigants is increased or decreased according to severity of ulceration and consequent diarrhea. Often treatments are best alternated with warm olive, cotton-seed, or mineral oil injections alone or containing bismuth, aristol, or salol, which soothe mucosa, protect and heal ulcers, and partially disinfect the bowel.

Topical Applications.—When general treatment and colonic medicated irrigation are reinforced by silver nitrate 6, ichthyol, balsam of Peru, or argyrol 20 per cent. topical applications made to extensive ulcers and lesions are occasionally fulgurated, diarrhea, bleeding, and rectal tenesmus are more quickly relieved.

Fulguration accomplishes better results with less pain and damage to tissues than *cauterization* with acids, Paquelin or electric cautery, stick silver, or copper. When stimulating applications irritate instead of healing lesions, they are discontinued for methylene-blue, 10 per cent., or hot oil bismuth emulsions employed twice weekly.

Surgical Treatment.—Surgical intervention is imperative in intestinal tuberculosis when other therapeutic measures and colonic

irrigation *per anum* fail to relieve distressing manifestations and arrest progress of the disease.

Tubercular colitis is more difficult to control than other inflammatory or ulcerative lesions causing chronic diarrhea and blood, pus, and mucus in stools, owing to debilitated state of the patient induced by tubercular foci elsewhere, and it is a mistake to postpone surgery until the patient is exhausted, and septic or pulmonary foci make an operation impracticable.

The following are the chief procedures employed alone or in conjunction in the *surgical* treatment of intestinal tuberculosis:

1. Appendicostomy.
2. Cecostomy.
3. Appendicocecostomy.
4. Ileocecostomy—Gant's.
5. Intestinal exclusion—short circuiting.
6. Resection.
7. Enterostomy.
8. Colostomy.

Appendicostomy, Appendicocecostomy, Cecostomy, Enterocostomy.—*Appendicostomy* (Figs. 1006, 1008) is performed more frequently than cecostomy or ileocecostomy because the technic is simple, a shorter time is required, mortality is not as high (1 per cent.), there is no leakage of gas and feces, stitch abscesses are rare, and the opening is more easily closed.

Cecostomy—not an artificial anus (Fig. 994)—is indicated when the appendix is congenitally absent, has been removed, or rendered unfit for irrigating purposes, because it cannot be freed without injury, is diseased, strictured, angulated, or too short, and when following appendicostomy the appendix has sloughed off.

Gant's *ileocecostomy* (Figs. 989, 993) is substituted for the above procedures when there is tubercular *ileocolitis*, because following this operation with aid of the author's *enterocolonic* irrigator (Fig. 992) both the large and small intestine can be irrigated separately or at the same time; appendicostomy and cecostomy are suitable only for *colonoctysis* and are not entirely effective when the ileum is involved.

Appendicocecostomy (Fig. 1019) has been performed several times by the author where, in attempting appendicostomy, the appendix was found unfit for the purpose, and it was amputated near the cecum and a catheter introduced through the stump into the bowel, following which the cecum was anchored to the abdominal wall by suspension stitches.

Appendicostomy or cecostomy and through-and-through irrigation is indicated in persons having intestinal tuberculosis who suffer severely from exhausting diarrhea, bacterial and chemical toxins, bleeding, irritation, and tenesmus incited by acrid discharges, gas accumulations or cramps incident to fermentation and putrefying food; when *enteroclysis per anum* does not accomplish desired results.

When infected foci are limited to the sigmoid flexure or rectum flushing through the anus is effective because fluid reaches all lesions, but when ulcers extend throughout the large bowel irrigation *per anum* often fails because the solution does not reach all segments of the colon on account of the patient's position, type of irrigation employed, or the irrigating tube curls in the rectum or sigmoid flexure, preventing the solution from flowing into the upper colon. Under such circumstances an artificial inlet should be made by performing *appendicostomy* (Fig. 1007), *cecostomy* (Fig. 999), or the author's *ileocecstomy* (Fig. 993), procedures useful in the treatment of tuberculosis involving all or a segment of colon, but which, with exception of the author's ileocecostomy, are not satisfactory when there is *enterocolitis*, because the solution cannot be made to pass the ileocecal valve; hence his ileocecostomy is substituted for them in this class of cases, since it provides for separate or simultaneous irrigation of both the large and small intestine.

While through-and-through irrigation (Fig. 1000) is beneficial in all varieties of intestinal tuberculosis, curative results are better in the *enteric—superficial* ulcerative than in the *enteroperitoneal—deep ulcerative, hyperplastic, fibrosclerotic, glandular, and peritoneal* types of infection.

Through-and-through irrigation following appendicostomy or cecostomy is preferable to flushing *per anum*, because the solution reaches all bowel segments from the cecal inlet to the anus, can be employed in any amount and rapidly passes through the gut, cleansing all lesions when a proctoscope or perforated self-retaining anal dilator (Fig. 1020) is introduced to allow the solution to escape without causing distention. Discomfort is less than from high enemata because fluid flows in a continuous stream and pain incident to fulness, weight, and stretching of gut are avoided.

The author has frequently performed appendicostomy and cecostomy, and employed through-and-through lavage as a preliminary treatment to *resection* and *intestinal exclusion* in exhausted and anemic patients suffering from persistent diarrhea, profuse hemorrhages and discharge of pus, and to hasten the disappearance of toxic manifestations and bring about a more speedy convalescence.

Irrigants employed in the treatment of intestinal tuberculosis following Gant's *appendicostomy*, *cecostomy*, or *ileocecostomy* are the same as when the solution is introduced *per anum* except the solution is employed in larger amounts. In either case results are better when the irrigant is used warm (90° F.) and the patient's position is frequently *changed* during the irrigation to insure medication reaching lesions in all segments of the large intestine.

Formerly the author *closed* appendical or cecal openings and suspended irrigation in a few weeks or when diarrhea and other manifestations disappeared, but now advises deferring this for six months or longer until all lesions are healed to avoid possible recurrence. Heretofore the appendical and cecal apertures were closed by destroying mucosa with acids or cautery, but now fulguration is employed for this purpose, pain from which is avoided by injecting a eucain solution ($\frac{1}{8}$ of 1 per cent.) about the aperture.

Patients afflicted with tubercular and other types of aggravated colitis rapidly improve following appendicostomy or cecostomy and medicated through-and-through irrigation, and more is accomplished in this way in one than is gained by non-surgical treatment in six months. Why surgeons fail to take advantage of these procedures in the treatment of chronic, inflammatory, and ulcerative lesions involving the small and large intestine is beyond the author's comprehension.

Appendicostomy and cecostomy with irrigation do not cure hyperplastic—neoplastic—fibrosclerotic—gas-pipe intestine—glandular or peritoneal intestinal tuberculosis, because the disease is not confined to the mucosa, but helps dissipate toxic manifestations and heal lesions complicating these types of infection.

Intestinal Exclusion.—In bowel tuberculosis, where hygienic and supportive measures reinforced by appendicostomy, cecostomy or ileocecostomy, and through-and-through irrigation fail to heal *superficial* or *deep ulcerative* lesions, arrest or relieve obstruction caused by hyperplastic tumors or fibrosclerotic *stenoses*, the tubercular segment of gut is excluded by *entero-anastomosis* (Fig. 1060), *unilateral* (Fig. 1059), or *bilateral exclusion* (Fig. 1068).

Exclusion facilitates a cure by keeping feces, toxins, bacteria, and irritating food remnants from irritating sensitive lesions and puts the bowel at rest. In connection with this procedure the author often performs *appendicostomy*, *cecostomy*, or forms a *vent* in the short-circuited segment of bowel to permit *drainage*, prevent backing up of secretions and feces, and allow the diseased bowel to be irrigated, which eliminates absorption of poisons, heals lesions, and makes the patient more comfortable. In 6 of the author's

aggravated cases of tubercular ulcerative colitis a cure resulted from this combined operation, which also proved effective in 3 cases of obstructive intestinal tuberculosis treated by him—hyperplastic 1, fibrosclerotic 2, that involved the cecum 1, ascending colon 1, and sigmoid flexure 1.

Intestinal exclusion is preferable to *enterostomy* or *colostomy* because it accomplishes the same purpose, permits feces to be evacuated through the rectum, and is free of the disgusting features

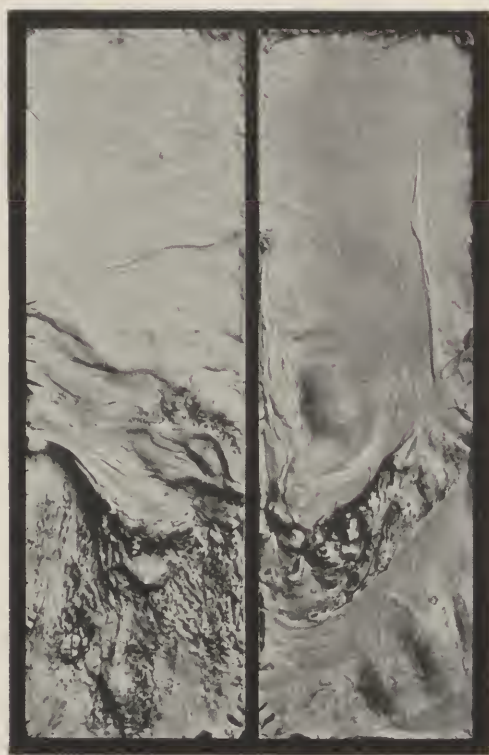


Fig. 773.—Tubercular ulceration and tumor involving the cecum. On the right the tumor mass is seen bulging the peritoneum.

of an artificial anus. For a full description of intestinal exclusion and tabulation of numerous cases for which the operation was performed by the author the reader is referred to Chapter XCV.

Resection.—Extirpation of the entire colon or any of its segments is a difficult, tedious, and dangerous procedure, and is not practised by the author unless the gut is riddled with ulcers, is distorted by numerous small and large widely scattered polyps or submucous fistulæ, partially or completely occluded by a hyper-

plastic tumor, single or multiple strictures, or fibrosclerotic tubular stenosis, or markedly obstructed by angulations and adhesions that permanently impair its function. Excision has the advantage over other therapeutic procedures in that when the patient survives it is curative because tubercular lesions destroying the patient are removed.

When the tubercular process is limited, extirpation of a short segment suffices, but in aggravated cases extirpation of the entire colon—colectomy—or ileocolic angle (Figs. 969, 971) is necessary, but excision of a *long* is little or no more dangerous than removal of a *short* section of the large intestine; *complete colectomy* is preferable to multiple resections where the disease is widely scattered.

Enterectomy, colectomy, and sigmoidectomy having been fully discussed in following chapters, their further discussion would be out of place here.

That the reader may compare the relative value of *intestinal exclusion* and *resection* the author has incorporated the statistics of Hartmann and Conrath.

OPERATIVE TREATMENT OF INTESTINAL TUBERCULOSIS

Author.	Nature of operation.	Number of cases.	Deaths.	Percentage of mortality.
Hartmann	Partial resection of cecum.....	9	1	11
	Resection with end-to-end anastomosis...	78	19	24
	Resection with side-to-side anastomosis..	31	5	16
	Resection a <i>Deux temps</i>	10	3	33
	Ileocolostomy.....	29	4	14
	Unilateral exclusion.....	9	1	11
	Bilateral exclusion.....	22	2	9
	End-to-side anastomosis.....	19	3	15
	Multiple operations.....	22	8	36
	Total and average percentage.....	229	46	20
Conrath	Resection.....	58	11	19
	Resection of intestinal wall.....	6		
	Entero-anastomosis.....	10		
	Enucleations.....	8	2	25
	Exploratory laparotomy.....	4		
	Total and average percentage.....	86	13	15

Enterostomy—Ileostomy and Colostomy.—Before the advent of appendicostomy and cecostomy, ileostomy (Fig. 1022) and colostomy (Figs. 1031, 1034) were occasionally performed to put the bowel at rest and relieve or cure otherwise uncontrollable tubercular and other types of ulcerative colitis, but since they possess no advantages over appendicostomy and cecostomy they have been

superseded by the latter because of the disgusting features connected with having an artificial anus established in the abdomen, erosions to skin incident to the escape of irritating fluid feces, and necessity of a dangerous abdominal operation to close the stoma when a cure is effected. When an artificial anus is decided on it is established well above the ulcerated area, obstructing tubercular tumor or stricture.

Ileostomy is sometimes, but *duodenostomy* and *jejunostomy* are never indicated, since intestinal tuberculosis is seldom encountered above the ileum. Enterostomy and colostomy are never performed by the author for tubercular ulcerative lesions except when hemorrhage endangers the patient's life and entero-anastomosis and other less objectionable procedures are impractical.

The methods of making and closing artificial ani and fecal fistulæ have received due consideration in Chapter XCVI, set apart for the purpose, making their further discussion here unnecessary.

From the author's experience and a study of the statistics of others relative to the operative treatment of intestinal tuberculosis and comparative value of different procedures he has drawn the following conclusions:

1. Mortality from operations performed for intestinal tuberculosis appears high and results not very good, but when one considers the condition of the subject and that the mortality from them is but slightly greater than for similar procedures employed for non-tubercular lesions, one realizes progress has been made in the surgical treatment of this affection.

2. Appendicostomy and cecostomy followed by through-and-through colonic irrigations are effective and should be more frequently employed in the treatment of tubercular ulcerative lesions of the intestine.

3. Neoplastic tuberculosis is nearly always encountered at the ileocecal region or rectum.

4. Hyperplastic or ileocecal tuberculosis is a surgical disease, and results following resection performed with comparatively little danger are good.

5. Mortality following extirpation of tubercular tumors is less than after other types of tuberculosis, and the former high mortality (30) has been reduced to about 10 per cent. through improved technic.

6. Exclusion is indicated in hyperplastic tuberculosis when complicated by pulmonary lesions, abscess, or fistula, the patient is exhausted from diarrhea, or the tumor is large and bound down by adhesions, conditions making resection dangerous.

7. Entero-anastomosis, unilateral and bilateral exclusion temporarily or completely relieve distressing manifestations of ulcerative lesions and cause tubercular neoplasms to shrink or disappear.

8. Ileocecal tubercular tumors frequently encountered and cured are often mistaken for carcinoma, and surgeons decline operation because of their size. Certainly records of a decade ago show but comparatively few cecal excisions for the relief of this condition.

9. There are fewer lung complications in hyperplastic than other types of intestinal tuberculosis because infection is more often primary and less virulent.

10. Results are better when the tubercular swelling is diagnosed and removed before infection involves neighboring organs or segments of intestine.

11. Entero-anastomosis, unilateral and bilateral exclusion, formerly regarded as palliative, are now considered curative in bowel tuberculosis.

12. Entero-anastomosis is the procedure of choice when the tubercular process extensively involves the small and large bowel and excision is impracticable.

13. Convalescence takes longer after exclusion than following extirpation of tubercular foci.

14. In hyperplastic ileocecal tuberculosis excision is preferable to exclusion.

15. Complications are fewer and results better when short-circuiting is reinforced by appendicostomy or cecostomy for the diseased bowel is drained and kept free of feces and discharge.

16. Entero-anastomosis of proximal with distal gut puts the intervening diseased bowel at rest and favors healing of lesions, while excision immediately eradicates it.

17. Short-circuiting is followed by frequent fluid or semisolid movements for weeks, or until ileum dilates and takes on colonic function, when stools become normal in number and consistency.

18. The low mortality following bilateral exclusion is partially offset by annoying fistula left to drain the excluded diseased intestine.

19. The chief objection to entero-anastomosis and unilateral exclusion in the treatment of intestinal tuberculosis is, the diseased area is left and nothing is done to prevent tubercle bacilli and irritating discharges from subsequently pouring over healthy bowel below.

20. Bilateral in inoperable cases and presence of fistula is preferable to unilateral exclusion operations because the gut is

closed above and below, foci and intestinal contents cannot reach nor infective material enter healthy intestine.

21. Preliminary partial or complete exclusion is justified prior to resection where the patient is unable to withstand a long operation to give him an opportunity to regain his strength before extirpation.

22. Short-circuiting to relieve obstruction from stricture at the point of anastomosis is sometimes necessary following excision.

23. Exclusion and entero-anastomosis operations are less dangerous than colectomy because they require less time and cause but little bleeding or shock.

24. Strictures rare in the jejunum and duodenum and common in the ileum and cecal region require the same operative treatment as other tubercular obstructing lesions.

25. Broken-down glands are removed, but nodes simply swollen and those difficult to reach are not destroyed.

26. Regarding mortality, it makes little difference whether one removes a short or long segment of gut.

27. The suture alone method is preferable to Murphy's button anastomosis except in urgent cases.

28. Frequency with which dangerous tubercular tumors and strictures are encountered indicate that operative procedures are often postponed longer than they should be in bowel tuberculosis.

29. Laparotomy, helpful in tubercular peritonitis, is useless when the disease involves intestinal mucosa.

Chapter LXXIV

Venereal Diseases of the Colon and Sigmoid Flexure

SYPHILIS—GONORRHEA

SYPHILITIC ENTERITIS AND COLITIS, GUMMATA, AND STRICTURE—GONORRHEAL COLITIS AND SIGMOIDITIS

Syphilitic Enteritis and Colitis.—Enteric and colonic lues is rare; the disease attacks the jejunum and particularly the rectum far more frequently than other segments of gut, and intestinal syphilis is encountered in women seven times oftener than in men.

Lues affecting the small or large intestine may be *congenital* or *acquired*. The author elsewhere¹ reported 7 cases of enterocolitis syphilitica—chronic diarrhea; 2 of these patients, a boy of six and a girl of eighteen, had at the age of one month congenital syphilis, exhibited by Hutchinson's teeth, enlarged fontanel, mucous patches of the mouth and throat, and fissures about the anus and vulva. In each instance one or both parents admitted having syphilis; the symptoms improved while they were under specific treatment, and a relapse followed when discontinued, as was shown in one instance by a positive Wassermann reaction obtained later. In both cases the rectum and sigmoid appeared healthy, and because of this, and the fact that these patients suffered frequently from abdominal cramps, distention, and soreness a diagnosis of syphilitic enterocolitis was made.

Four other cases, 2 men and 2 women, whose ages ranged from nineteen to thirty-seven, suffered from acquired syphilis; each admitted having had a chancre, and in 3 this evidence was verified by typical cicatrices. All gave a clear history of having suffered from the usual manifestations of lues, fever, skin eruptions, erosions of the mouth and throat, enlarged glands, and falling out of the hair.

In one case, a man twenty years of age, the clinical diagnosis of lues was confirmed by finding *Spirochetæ pallida* and obtaining repeated positive Wassermann reactions, but in the other 3 cases the latter methods of diagnosis were not employed, since patients had previously undergone antisiphilitic treatment.

¹ Gant, Diarrheal, Inflammatory, and Parasitic Diseases, p. 295, 1915.

The diagnosis in these cases was based upon the findings—the patient had syphilis, diarrhea was controlled by antiluetic treatment, and other infection—bacillary colitis, tuberculosis, entamebiasis, etc.—that would account for loose movements was absent.

The seventh case was a bookmaker, fifty years old, riddled with syphilis, suffering from auto-intoxication and extensive colonic ulceration, causing persistent diarrhea. This case was seen before the advent of appendicostomy and cecostomy; colostomy was advised, and when the author attempted to lift the bowel upward it tore in two, and it was with great difficulty that the hard, brittle, and ragged ends were brought out and sutured to the skin to form an artificial anus. After a painstaking examination of the patient and microscopic examination of sectioned tissue removed in this case the author became convinced that frequent and fluid movements were due to syphilitic degeneration of the colon, for the rectum and sigmoid as high as they could be inspected through the sigmoidoscope were extensively invaded by what appeared to be luetic ulcers; repeated positive Wassermanns were obtained and the patient improved when given antisymphilitic treatment.

Since publication of the above the author has treated 2 other cases of undoubted syphilitic enterocolitis complicated by persistent diarrhea, with mucus, pus, and blood in the stools.

Etiology.—*Spirocheta Pallida*.—*Treponema pallidum*, responsible for syphilis of the intestine, is seldom demonstrable owing to chronicity of the disease when seen.

Pathology.—Chronic diarrhea incident to lues may be induced by syphilitic lesions in the small intestine, colon, or rectum. Syphilitic diarrhea has been associated with luetic *inflammation*, *ulceration*, *gummata*, and *strictures* involving the small or large intestine and rectum.

Enteritis and *colitis syphilitica* are common to *early*, and *gummata* and *stenoses* to the *later* stages of lues. The manner in which involvement of the bowel occurs is not understood. Colitis syphilitica is characterized by an inflamed mucosa with *erosions*, and when the luetic process is not arrested Lieberkühn's or Peycr's patches give way and numerous ulcers of variable size form. Luetic ulcers from degenerating gummata have a firm raised border and differ from entamebic and tubercular lesions, which are larger, have undermined edges, and in the presence of mixed infection diarrhea is more annoying and the discharge is greater.

Syphilitic ulcers of the intestine or colon may be single or multiple, in groups, or be scattered throughout the bowel, and lesions encircling the gut sometimes lead to strictures.

Symptoms.—The manifestations of enterocolitis syphilitica resemble those of chronic diarrhea induced by *catarrhal*, *entamebic*, *bacillary*, and *tubercular* colitis. In addition to diarrhea complicated by blood, mucus, and pus in evacuations and loss of weight, syphilitic patients suffer from mucous patches in the mouth, throat, or anus, falling out of the hair, and give a history of having had a chancre and skin eruption.

Diagnosis.—The symptomatic *diagnosis* of chronic diarrhea consequent upon syphilitic lesions in the small or large intestine is difficult to make in the absence of *stigmata*.

When a patient afflicted with usual manifestations of an inflamed and ulcerated colon admits having had a chancre, usual skin eruption, loss of hair, erosions of the mouth and throat, or exhibits *stigmata*—cachexia, Hutchinson's teeth, ocular disturbances, iritis, fissures about the anus, snuffles, melena associated with enlargement of the liver, spleen, or lymph-nodes—one is justified in making a tentative diagnosis of luetic enterocolitis.

If, in addition, *Spirocheta pallida* are discovered, and the patient repeatedly gives a positive Wassermann reaction, diarrhea is probably due to intestinal lues and mixed infection. Such cases rapidly improve under antisiphilitic and remain stationary or get worse under any other treatment.

The **prognosis** of syphilitic enterocolitis is good except in deplorable cases where the disease has made extensive inroads on the bowel, caused stricture, extensive adhesions, or perforation.

Treatment.—More is accomplished with drugs in luetic than other chronic infections involving the small or large intestine; the author has often verified the value of antiluetic remedies in the treatment of diarrhea caused by syphilitic inflammation, ulceration, or gummata of the bowel.

Debilitated and anemic subjects do better when *specific treatment* is reinforced by dietetic measures, tonics, change of surroundings, hydrotherapy, mild electric treatments, and exercise in the open air.

Substitutes—*arsenical preparations*—have been brought forward to take the place of potassium iodid and mercury, but they have not proved superior to these agents.

Salvarsan—Ehrlich's—is employed in the treatment of syphilis because it sometimes quickly destroys spirochetes and alleviates symptoms. Salvarsan is often beneficial in the *first* and *second* and helpful in tertiary, but is of little or no use in the destructive *terminal* stage of syphilis unless employed in conjunction with potassium iodid.

Absorption follows when salvarsan is injected beneath the *skin* into the *muscles* or *veins*, but the *intravenous* method is preferable, because it induces less pain, is seldom followed by sequelæ, and gives quicker and better results. This procedure must be practised with the care observed in other operations, and the patient should remain in the house for a day, otherwise serious complications may follow.

Elimination begins in from thirty-six to forty-eight hours, and late effects of salvarsan are nephritic irritation, gastro-intestinal irritability, and interference with organs of special sense.

The treatment is continued until the spirochetes disappear and Wassermann's tests are negative. Injections are made subsequently when spirilla are discovered or the patient exhibits a positive Wassermann. A single injection is employed in *symptomatic*, but repeated doses are necessary in the *curative* treatment of intestinal lues causing diarrhea.

The average *dose* is gr. x (0.60) for men and gr. viiss (0.50) for women, given in weekly injections, extending over a period of from three to five weeks. The dose for children eight years or older is gr. v (0.30) and for infants from gr. $\frac{1}{6}$ to $\frac{1}{3}$ (0.01–0.02).

Patients afflicted with *syphilitic colitis* improve following salvarsan injections, but the remedy is not curative unless reinforced by medicated colonic irrigations, which cleanse the irritated mucosa of feces, toxins, and acrid discharges.

Neosalvarsan is well tolerated, causes little reaction, is effective, and indications for and technic of administering it are the same as for salvarsan. The dose for men is gr. xiiij to xv (0.86–1.0), and for women, gr. x to xiiij (0.60–0.86).

Mercury and *potassium iodid*, alone or in combination, barring salvarsan, are the remedies *par excellence* in the treatment of intestinal lues. They possess a specific action, but now and then patients suffering from congenital or acquired syphilis with chronic diarrhea do not improve on account of ulceration or irritation of the mucosa caused by mercury.

Syphilitic diarrhea occurs in late stages of lues, and it is advisable to place the patient on the combined *mercury* and *potassium iodid* treatment to arrest the disease and heal the inflamed ulcerated bowel, or hasten absorption of gummatous infiltration. Few persons can take mercury or iodids for months without suffering constitutional disturbances, and they are administered for a time, discontinued for a short period, then renewed. Later, as their influence on the disease becomes manifest, periods of active treatment are shortened.

When potassium iodid is given by mouth the patient is instructed to begin with mxx (0.60 c.c.) of a saturated solution three times daily, and increase the dose until the physiologic effect is observed, when the dose is diminished or the drug discontinued. Mercury may arrest extension of the luetic process, but potassium iodid hastens absorption of inflammatory exudates and gummata.

Iodipin is a good substitute for iodids because it can be administered for a longer time without producing iodism.

Mercurial preparations are reliable in the treatment of syphilitic lesions of the intestine causing diarrhea when administered by mouth, inunction, hypodermically, fumigation, intravenously, or in suppositories.

Mercury in tablet or pill often induces gastro-intestinal disturbances, and is preferably administered in the form of an inunction—oleate and blue ointment—or injection beneath the skin or into muscles. Mercury bichlorid, gr. $\frac{1}{32}$ to $\frac{1}{8}$ (0.002–0.008); biniodid, gr. $\frac{1}{50}$ to $\frac{1}{10}$ (0.0012–0.006); protoiodid, gr. $\frac{1}{6}$ to $\frac{1}{3}$ (0.01–0.02), and tannate, gr. j to ij (0.065–0.13), have been successfully employed in the treatment of syphilis involving the intestines and other organs.

When these preparations do not meet indications or disagree with the patient, a blue pill, calomel or the peptonate, sozoiodolate, carbonate, or salicylate of mercury is substituted for them.

Where tuberculosis attacks the intestines of a syphilitic subject the *succinate* is given preference over other mercurial preparations.

Gummata.—Gummatous infiltration is the most frequent manifestation of lues affecting the small intestine and colon. These tumors, which are rare in the rectum—the author having encountered but three in twenty years—may be single or multiple, ovoid, saucer or ridge-like in shape, originate in the *submucosa*, involve all intestinal tunics, and cause diarrhea through obstruction or ulceration following retrogressive changes in the tumor mass.

Gummata are *diagnosed* on their clinical history, slow growth, peculiar shape, accompanying syphilitic stigmata, manifestations of intestinal obstruction or diarrhea, and the positive Wassermann reactions.

Treatment.—Occasionally gummata diminish in size or entirely disappear under antisiphilitic treatment, administration of laxatives to soften and prevent feces collecting above the growth, and daily colonic irrigations of ichthyol or balsam of Peru 5 per cent. when the mass has undergone degeneration.

Extirpation may be required to relieve obstruction, but when gummata are large, multiple, complicated by adhesions, or the patient is exhausted, *intestinal exclusion* is the operation of choice.

or an *artificial anus* above the growth is indicated. The patient rapidly improves as the result of bowel rest and treatment, and sometimes the artificial anus is closed following resection of the involved gut or absorption of the tumor.

Strictures.—Syphilitic stenoses of the small bowel and colon are occasional complications of congenital and acquired intestinal lues. In these cases the patient complains of constipation, then obstipation and diarrhea, and finally frequent loose movements that become more annoying as obstruction increases.

Luetic strictures may result from an encircling gumma, cicatricial ring incident to healed ulcers, or tube-like narrowing, *gas-pipe intestine*, where the gut undergoes fibrosis the result of a subacute inflammatory process. Stenoses are usually single, but may be multiple, and complicated by ulceration at and above the constriction, which aggravates diarrhea and is responsible for pus, blood, and mucus in the stools. Occasionally fecal or infecting agents lodge in lesions to cause inflammation, pericolitis, adhesions, peritonitis, or pyostercoral abscess.

Treatment.—It is advisable to prescribe antiluetic remedies to arrest the syphilitic process and prevent the formation of new stenoses, but these agents will not eliminate existing strictures composed of cicatricial tissue complicated by extensive ulceration.

The author in favorable cases *resects* the gut when there is a single stricture or multiple stenoses involving a comparatively short segment of the bowel; but when resection is impracticable the diseased portion is put at rest by *entero-anastomosis*, *unilateral* or *bilateral* exclusion (see Chapter XCV).

Owing to its disagreeable features, he rarely resorts to *colostomy* unless stricture is almost complete, manifestations of obstruction are dangerous, or it is imperative that the intestine be immediately drained.

Postoperative medicated colonic irrigations are serviceable because they soothe mucosa, free the gut of irritating *débris*, heal ulcers, and clear up intestinal auto-intoxication. Ichthyol, balsam of Peru and argyrol solutions, and oil-bismuth emulsions can be satisfactorily projected into all parts of the colon with the patient in the knee-chest or inverted posture with the aid of a suitable tube and syringe or irrigator.

When for any reason medication cannot be made to reach the inflamed or ulcerated area above the stenosis, *appendicostomy* or *cecostomy* is performed to insure active through-and-through colonic irrigation.

Gonorrheal Colitis and Sigmoiditis.—Gonorrheal inflamma-

tion involves the colon and rectum more often than is generally supposed, is encountered in women and children more frequently than in men, occurs in the various walks of life and in all lands, but is observed more often in Europeans and Asiatics than Americans, because a greater percentage of the former are *pederasts*.

Gonorrhea of the large intestine, as elsewhere, is caused by the *gonococcus* of Neisser, the anorectal mucosa first becoming infected, whence the inflammatory process extends upward to involve the sigmoid flexure and colon.

In 75 per cent. or more of cases infection is limited to the anal canal, rectum, or sigmoid flexure, is *acute*, and accompanied by frequent evacuations and marked rectal tenesmus.

Chronic diarrhea may be a sequel of gonorrheal proctitis, but under such circumstances stools rarely contain gonococci, and the frequent movements are incidental to catarrhal inflammation or ulcers started by the original, and continued by secondary or mixed infection.

On account of close relation between anus and vagina and careless manner with which most individuals having gonorrheal urethritis or vaginitis look after themselves, it is remarkable that the rectum is not more frequently infected by vaginal discharges that pass over the anus or unclean fingers while scratching or wiping the anus.

The author has treated many adults for gonorrheal proctitis contracted in the latter way, handled 3 men, admitted pederasts, who caught the disease during rectal intercourse, and has treated 6 children—2 boys and 4 girls—for gonorrheal colitis infected by nurses or governesses.

Pathology.—Changes in the mucosa in gonorrheal coloproctitis are less serious than those of tubercular, syphilitic, entamebic, or bacillary colitis, because ravages of mixed infection are less. In these cases the mucous membrane in the infected zone is highly inflamed, sensitive, greatly swollen, often edematous, smeared over with foul-smelling, thick yellow pus, and occasionally marked by erosions, but is seldom extensively ulcerated.

Symptoms.—The manifestations of gonorrhea differ from other types of coloproctitis in that disturbances complained of are located chiefly in the lower bowel. During the acute stage tenesmus, burning pain, and sensations of weight and fulness in the rectum are constant, and the patient has a never-ending desire to stool, not relieved by an evacuation. Movements are occasionally mushy or semisolid, but usually are fluid, foul-smelling, and composed largely of thick yellow pus and mucus. Acute manifestations

generally moderate and disappear quickly without leaving sequelæ under the treatment outlined below.

Diagnosis.—Gonorrheal coloproctitis is diagnosed by acute symptoms characterizing the inflammation, inspecting the highly congested edematous rectal mucosa through the proctoscope, and finding *gonococci* in the discharge or feces.

Treatment.—Gonorrheal coloproctitis is, in the average case, quickly relieved or cured by keeping the patient in bed, restricting him to a fluid or semisolid diet, applying ice to the spine, and frequently irrigating the colon and rectum with a hot ichthyol, balsam of Peru, or argyrol 3 per cent. solution.

When the patient complains bitterly of rectal pain, sphincter-algia, and spasmodic contraction of the levator ani muscle and difficult micturition, insertion of a suppository containing morphin or cocain, gr. $\frac{1}{8}$ (0.008), and belladonna, gr. $\frac{1}{4}$ (0.015), brings immediate relief. In addition, much can be done for the patient's comfort by injecting a hot emulsion composed of olive oil, ℥ij (90.0), and bismuth, ℥ss (2.0), nightly, which soothes the gut, quiets irritable muscles, and forms a coating over the sensitive eroded mucosa, protecting it from feces, discharge, and toxins.

As acute manifestations subside the patient is permitted to be up and about and resume a mixed, non-irritating, regular diet, irrigations being continued until diarrhea ceases, gonococci disappear from the stools, and evidence of inflammation is no longer visible through the proctoscope.

Appendicostomy and *cecostomy* (Figs. 1006, 1010) with through-and-through colonic irrigation, useful in other and chronic types of specific colitis, are not required here unless a catarrhal inflammation or ulcers involve the mucosa after the gonorrhea has been cured.

Chapter LXXV

Gastro-intestinal Toxic Disturbances—Ptomain Poisoning and Chemical Poisoning

PTOMAIN POISONING

GASTRO-INTESTINAL, colonic, and rectal disturbances arising from bacterial and medicinal or chemical poisoning occur more frequently than suspected, but diarrhea, cramps, nausea, vomiting, and other bowel manifestations caused by contamination of food through being improperly canned or cooked in brass vessels is encountered less often than toxemia induced by bacteria and their toxins. Poisoning from the latter source may be induced by eating diseased or putrefying meat or consuming raw or insufficiently cooked food that has been exposed to flies and other infecting agents.

Most often ptomain poisoning has followed eating of veal, beef, pork, sausage, chicken salad, potted tongue, lobsters, oysters, crabs, clams, fish, canned goods, ice-cream, custard, puddings, potatoes, beans, and particularly mushrooms.

In meat poisoning, except *botulism*—sausage toxemia—there is gastro-enteritis together with congestion, edema, and hemorrhagic areas in the mucosa, and in virulent cases intestinal ulceration complicated by bleeding. Sausage poisoning affects the central nervous system, causing serious secretory disturbances and muscular paralysis.

Toxemia resulting from meat occurs most often in summer, and crowds not having suitable accommodations for protecting, storing, and cooking food. Organisms most frequently associated with such infections are the *colon bacillus*, *Bacillus enteritidis*, *B. enteritidis sporogenes*, *staphylococci*, *streptococci*, and *paratyphoid*. Sausage poisoning is caused by the *Bacillus botulinus*, and Vaughn attributes cheese toxemia to the alkaloidal *tyrotoxicon*, but others believe it to be the result of *bacterial* action.

Fish and *shell-fish* toxemias usually result from eating oysters, lobsters, crabs, clams, and muscles contaminated by sewage. Bacteria are destroyed by high heat in cooking, while their toxins are not.

Potato poisoning is due to *solanin*, and mushroom toxemia is caused by *muscarin*.

Symptoms.—The manifestations of ptomain and food poisoning vary with virulence and amount of toxins consumed and absorbed, and distressing manifestations appear shortly afterward. In the *mildest* form ptomain poisoning is accompanied by nausea, vomiting, anorexia, dizziness, blanching of the skin, which frequently has a greenish hue, elevated or subnormal temperature, cold perspiration, marked muscular weakness, mild or severe abdominal pain, bursting occipital headache, restlessness, explosive diarrhea, and yellow offensive stools; but when toxemia is virulent the attack resembles cholera in so far as vomiting, purging, and frequent colorless watery evacuations are concerned, and the patient suffers from thirst, subnormal temperature, livid skin, fast pulse, cramps in the abdomen and legs, depression, dimness of vision, difficult breathing, coated tongue, buccal soreness, lassitude, retention of urine, icterus, convulsions, paralysis, or collapse.

The abdomen is usually tender, painful on pressure, and distended; occasionally the liver and spleen enlarge, albumin in urine is abundant and subsides with the attack, as does hematuria and erythema, urticaria; hemorrhagic spots are frequent complications.

The symptoms of *botulism*, or sausage poisoning, require separate consideration because here obstinate *constipation* prevails more often than *diarrhea*, and patients afflicted with it suffer from minor gastro-intestinal disturbances, but serious *nerve* and *secretory* disturbances are evident that resemble belladonna poisoning—ocular manifestations, dysphagia, aphonia, dryness of the mouth and throat due to deficient salivary secretion, and retention of urine.

The **diagnosis** in ptomain and food poisoning is made upon finding bacteria or toxins in articles of diet consumed, vomitus, or stools, and studying characteristic manifestations.

Treatment.—Prophylaxis consists in properly selecting and protecting food from flies and other insects, and keeping it cool and free from moisture to prevent putrefaction. Routine treatment is impracticable, but urgent symptoms are often abated or relieved by gastric lavage, high colonic irrigations, administering an emetic—mustard or apomorphin—prescribing calomel or castor oil to eliminate toxins; mucilaginous drinks to allay gastro-intestinal irritation; bismuth, beta-naphthol, or charcoal to relieve distress, lessen bacterial activity, and mitigate diarrhea, nausea, and vomiting; digitalis, strychnin, or whisky to strengthen the patient and opium, gr. $\frac{1}{2}$ (0.03), and belladonna, gr. $\frac{1}{4}$ (0.015), to relieve abdominal pain and cramps. Subsequently the treatment employed in sub-

acute catarrhal enterocolitis is indicated in the treatment of ptomain poisoning.

MEDICINAL AND CHEMICAL POISONING

Certain medicines and chemicals that gain entrance to the body by way of the mouth, through inhalation or absorption, or being introduced *per rectum*, have caused constipation, aggravated diarrhea, hemorrhage, the discharge of mucus and blood, and pain by disturbing central or local nerve centers, inducing inflammation or ulceration of intestinal mucosa. Arsenic, mercury, lead, phosphorus, acids, alkalies, and cathartics are the agents that have most frequently caused bowel manifestations when prescribed for the relief of constipation, taken with suicidal intent, inhaled, or absorbed while working in factories.

Symptoms vary with the chemical causing the trouble, and the **diagnosis** is based on getting a history of the case, studying symptoms, and detecting the irritating agent.

Treatment.—The effect of caustics—alkalies—is best counteracted by administering dilute acid drinks to neutralize and wash out the poison; milk, flour, or oil to protect the raw mucosa; morphin with atropin to allay pain and visceral spasms, and fluid or soft foods that cause little irritation.

Later, bismuth, chalk, tannalbin, or beta-naphthol are prescribed because of their soothing antiseptic, astringent, or healing action on the irritable gastro-intestinal mucosa, which relieves the patient of diarrhea, digestive disturbances, and discomfort. Should coloproctitis persist, ichthyol 2 or boric acid 4 per cent. irrigations are indicated.

In **arsenic poisoning** the drug is stopped or the patient's occupation changed and measures are taken to eliminate the drug from the system—gastro-intestinal lavage and emetics; symptoms are abated by administering magnesia compound and iron hydrate in liberal doses at short intervals.

Lead poisoning when occupational, or caused by drinking water from lead-lined pipes or cisterns, is treated by changing water or vocation, prescribing an opiate for pain, a cathartic for constipation, and medication suitable for other manifestations as they arise.

Acid poisoning is most effectively controlled by immediate gastric lavage and prescribing soap, lime-water, or mucilage to counteract the escharotic action of the chemical and later confining the patient to a fluid diet or nourishing rectal enemata, administering gastro-intestinal sedatives, bismuth, charcoal, etc., stimulating the patient, and employing soothing colonic irrigations.

In **mercurial poisoning** further taking, inhaling, or absorption of the drug is stopped, the mouth is rinsed with a solution of potassium chlorate and myrrh, and a non-irritating diet, sulphur baths, and potassium iodid are prescribed reinforced by supportive treatment, colonic irrigations, together with antiseptic and astringent agents to control diarrhea.

Chapter LXXVI

Rectocolonic Pigmentation

CHROMATOSIS, HEMACHROMATOSIS

ORGANS throughout the body occasionally undergo pigmentation, and the colon and rectum are sometimes discolored in this manner. The author has observed 6 cases of pigmentation involving the colon, sigmoid flexure, and rectum, in 2 of which discoloration stopped at the upper extremity of the anal canal (see Plate X).

Salger reported 7 cases of pigmentation of the colon occurring in cachectic individuals past forty where discoloration stopped at the ileocecal valve and involved the tunica propria of the mucosa only. Pick's 18 collected cases involved the mucosa from the ileocecal valve to the anus, the small gut being free of pigmentation in all cases. He claims that "the melanin of melanosis originates from the aromatic albumin disintegration products of the large intestine—indol, skatol—under the influence of an oxydative ferment resembling tyrosinase, produced by the connective-tissue cells of the mucosa."

Pigments responsible for the condition may be *endogenous*, being formed within the body, or *exogenous* when derived from the outside through the inhalation or absorption of colored dust and metallic poisons, or taking silver nitrate internally, the most common examples of which are *blue gums* in lead-poisoning and *argyria* induced by discoloration of superficial epithelial cells throughout the body caused by spraying the throat with or taking silver nitrate internally. Endogenous is encountered more frequently than exogenous pigmentation of the intestines.

Rectocolonic hemachromatosis may result from abnormal deposits of iron pigment—hemosiderin—or accumulation of pigment devoid of iron—hemofuscin—and discoloration of the bowel may occur independently or be associated with a like condition in other organs.

Intestinal chromatosis has occasionally been encountered in connection with cirrhosis of the liver or pancreas and diabetes, under which circumstances it is diagnosed as *bronzed diabetes*, owing to the peculiar hue of the skin. Pigmentation may be limited to small or large areas, but in the author's cases of rectocolonic

PLATE X



Rectocolonic chromatosis.

hemachromatosis the bowel was discolored on all sides as far up as could be seen through the sigmoidoscope, and in one postmortem specimen examined by him the entire colon was involved, but pigmentation stopped abruptly at the ileocecal valve.

Chromatosis is sometimes associated with different cachexias, and under these and other circumstances pigment may be derived from the blood—*hematogenous*—bile—*hepatogenous*—or be elaborated by the cells—*metabolic*.

The **etiopathology** of hemachromatosis is uncertain, but the condition has most often been observed in patients suffering from disease complicated by congestion or occlusion of the blood-vessels, but in 3 of the author's cases no such affection was discoverable, and pigmentation of the rectum was detected while he was examining the rectum for local lesions responsible for pain or bleeding. In the other 3 cases observed by him hemachromatosis was encountered in individuals suffering from catarrhal coloproctitis, which in 2 instances were complicated by invagination of the sigmoid which choked the rectum, producing a constant desire for an evacuation, and in the third by carcinoma located at the rectosigmoidal juncture.

In rectocolonic hemachromatosis the mucous membrane, which is relaxed, thickened, thrown into folds, and often clogs the end of the proctoscope, is *mottled* when slight and of a *reddish dark brown* or *liver color* when pigmentation is marked. Erosions were seen in 2 instances, but ulcers were not observed in any of the author's 6 cases, in all of which slight or marked varicosities of the anorectal veins were observed.

Symptoms.—The symptoms of hemachromatosis are not typical, and in a majority of the author's cases resemble those induced by moderate degree catarrhal coloproctitis plus constipation, sensations of fulness in the rectum and frequent desire to stool induced by a relaxed thickened mucous membrane or invagination of the sigmoid flexure into the rectum.

Diagnosis.—The diagnosis is quickly made by introducing the sigmoidoscope and inspecting the peculiar discoloration of the mucosa, which does not complicate any other disease excepting melanotic carcinoma and sarcoma, separately discussed in Chapter XCII.

Treatment.—An attempt should be made to relieve congestion of the portal system consequent upon heart, liver, or pancreatic affections, but there is no known treatment that will cause rectocolonic pigmentation to completely disappear.

In the author's 6 cases hemachromatosis continued while the

patients were under observation, which in one was twelve and in another twenty years. In 2 instances symptoms were modified by restoring the invaginated sigmoid to its normal position by *sigmoidopexy* reinforced by topical applications and medicated enemata, which reduced congestion of the mucosa. In the other cases of pigmentation associated with catarrhal coloproctitis the treatment employed was the same as recommended for this condition.

Surgery is not indicated in cases of hemachromatosis involving the colon and rectum except for the relief and cure of other diseases complicating this affection.

Chapter LXXVII

Organic Diseases

RESULTANT GASTRO-INTESTINAL, COLONIC, AND RECTAL DISTURBANCES

INFECTIONS involving organs near and distant to the alimentary tract frequently induce constipation, faulty digestion, diarrhea, intestinal discomfort or discharges, pus, blood, or mucus alone or admixed, especially when they lead to inflammation or exfoliation of mucosa.

Eye abnormalities causing such manifestations are reflex, rare, and relieved by correcting errors in refraction or resting the eyes.

Mouth affections arising from diseased or imperfect teeth, ulceration, abscess, or pyorrhea occasionally lead to intestinal ailments through the swallowing of irritating or infected discharges.

Treatment embraces cleansing the tongue, teeth, ulcerated areas, abscess, pockets, and bridgework, and operating upon or treating causative lesions.

Nasopharyngeal diseases sometimes react upon the gastro-intestinal system, causing nausea, vomiting, or diarrhea, and catarrhal or infectious enterocolitis has complicated infected sinuses and tonsils evidenced by finding bacteria in the discharge or secretions, and adenoids are sometimes responsible for intestinal disturbances in children.

Treatment is varied and may involve draining sinuses, removing dead bone, excising adenoids and tonsils, together with irrigation and topical applications made to affected areas in the bowel.

Thyroid Disease.—Exophthalmic goiter reflexly or through the action of generated toxins is often responsible for obstinate diarrhea, ravenous appetite, marked peristalsis, and other enterocolonic manifestations.

Treatment includes palliative measures—change of climate, occupation, rest cure, hydrotherapy, massage, and symptomatic medication, reinforced by suprarenal gland extract and roentgenotherapy.

Usually the disease is *surgical* from the beginning and time should not be wasted with medical treatment.

Hepatic and associated ailments—gall-stones, obstructed bile ducts, malignancy, hepatitis, cirrhosis, icterus—jaundice—and disturbed portal circulation—are common factors in vomiting, abnormally colored stools, diarrhea, and intestinal bleeding.

Treatment, such as out-door exercise, alkaline water drinking, nourishing non-irritating diet, friction massage, together with the administration of olive oil and antiseptics, relieve diarrhea and intestinal discomfort, but when movements are frequent, irritating, and offensive, and cramps or pain from biliary calculi are severe, opium, gr. $\frac{1}{2}$ (0.03), and belladonna, gr. $\frac{1}{4}$ (0.015), are indicated.

Laparotomy is frequently advisable that gall-stones may be removed, the gall-bladder drained, or an hepatic abscess may be opened.

Pancreatic Disturbances.—Pancreatitis or obstructed ducts are usually accompanied by fatty loose movements—*steatorrhea*—a condition frequently requiring surgical interference, though manifestations may be allayed when there is catarrhal duodenitis through a non-irritative non-fatty diet, administration of salines and anti-diarrheal agents, in conjunction with colonic irrigation.

Kidney lesions may aggravate or cause increased fluid evacuations and other intestinal manifestations. Intestinal *uremic ulcers* have been encountered in *chronic nephritic* subjects, and hemorrhagic infarcts have been occasionally observed.

Treatment when successful must improve or heal lesions in the kidneys to prevent the formation of toxins affecting the general system and bowel; local and symptomatic treatment are at times necessary.

Diarrhea and other manifestations induced by *diabetes mellitus* are relieved by fresh air, rest, regular hours, diminishing sugar in the urine by restricting the diet as regards carbohydrates and farinaceous food, and prescribing medicines that allay diarrhea, procure rest, and improve metabolism.

Suprarenal—Addison's—disease, in addition to other serious manifestations, is often complicated by abdominal discomfort and gastro-intestinal disturbances.

Treatment alleviates symptoms, but is not curative.

Genital affections may reflexly or through extension of disease to the bowel cause obstruction, constipation, diarrhea, or inflammation of the intestinal mucosa.

Treatment includes looking after local disease involving the genitals reinforced by topical applications or surgery of the bowel when indicated.

Skin diseases—*urticaria*, *acrodynia*, *erythema*, *exudativum*

multiforme, *acute eczema*, *pemphigus vulgaris*, *pityriasis rubra*, *scleroderma neonatorum*, and *extensive burns* are associated with or induce loss of appetite, diarrhea, marasmus, and other gastrointestinal manifestations.

For the **treatment** of these and other dermatologic lesions the reader is referred elsewhere to the special chapter devoted to skin lesions.

Bone Diseases.—Pott's or hip-joint disease and tubercular bone lesions elsewhere are occasionally reflected in the bowel by a catarrhal inflammation or ulcers responsible for loose movements, abdominal discomfort or mucus, pus, or blood in the stools.

Treatment consists in healing or excising diseased bone and building up the patient through hygienic methods, forced feeding, and medication.

Brain and spinal cord diseases responsible for constipation, diarrhea, fecal incontinence, and other bowel disturbances not relieved by antisyphilitic and tubercular remedies are incurable unless corrected by surgery.

Diseases of the Stomach—Gastrogenic Diarrhea, Dyspeptic Diarrhea, Lienteric Diarrhea.—This type of diarrhea may be induced by *achylia gastrica*—subacidity—*hyperacidity*, *atony*, *motor insufficiency*, or *malignancy*, either of which may temporarily or permanently impair the functioning power of the stomach or intestine, particularly when the patient has a lowered resistance.

In this affection there is usually but slight discomfort in the stomach, diarrheal manifestations being the chief source of annoyance.

Certain organisms, like yeast, fungi, proteus bacilli, cocci, and streptococci, are often found in large numbers in feces of patients suffering from *gastro-intestinal dyspeptic diarrhea* and are possibly factors in its causation.

Patients afflicted with *gastrogenic diarrhea* suffer slightly, place little importance on gastric *symptoms*, but complain bitterly of diarrhea. Loose movements may occur at shorter or longer intervals or be continuous, according to gravity of the case, and nervous individuals suffer most.

Early in *diarrhea gastrica* the intestine is not involved, but later enterocolitis develops through trauma and irritation to the mucosa, and in severe cases mucus, pus, and blood complicate the symptom-complex.

Symptoms and Diagnosis.—The *lienteric* character of stools is the chief manifestation in *gastrogenic diarrhea*, the feces containing undigested connective-tissue remnants.

Gastrogenic diarrhea is suspected, but cannot always be proved when gastric secretion varies, and examination of the stools demonstrates the absence of pus, blood, and mucus. The author considers diarrheas preceded by chronic gastric disturbances and those improved by the hydrochloric acid or gastric lavage where the feces contain pieces of meat, connective-tissue remnants, yeasts, sarcinae, long bacilli, proteus, and other fermentative or putrefactive organisms as being partially or entirely due to achylia gastrica, hyperacidity, atony, insufficient motility, or gastric malignancy.

Main reliance in the *diagnosis* consists in studying feces following a *test diet* of milk, toast, oatmeal, eggs, beef, mashed potatoes, and butter. The analysis shows connective-tissue threads, imperfectly digested vegetables, fats, albuminoids, biliary deficiency, glairy mucus, and discarded epithelial cells when the mucosa is inflamed, and presence in large numbers of micro-organisms that produce fermentation and decomposition.

Independent or associated *fermentation dyspepsia* is recognized by the symptoms and coprologic findings, yellow, pasty, foamy, disagreeable acid stools containing starch remnants, and colostrum butyricum, and incubator tests show carbohydrate fermentation.

Enteritis or enterocolitis may be present before or develop on the basis of chronic gastrogenic diarrhea when mucus, pus, and blood are found in the stools.

Cancer of the stomach induces stagnation, severe dragging pains in the epigastric region, vomiting of undigested food, cachexia, indicanuria, visible peristalsis and diminished HCl, and ferments while lactic and fatty acids are abundant. Examination of stomach contents shows bright clotted blood, pus, mucus, tissue shreds, Oppler-Boas bacillus, and sarcinae.

Treatment.—When diarrhea gastrica is consequent upon *diminished acidity* hydrochloric acid is administered three times daily, and this agent is also effective when there is *atony* or *impaired motility* when combined with a bitter tonic.

Loose movements consequent upon *hyperacidity* are best controlled by alkaline and sedative preparations of bicarbonate of soda, magnesia, charcoal, or bismuth, alone or in combination with belladonna.

In the *fermentative* type of gastrogenic diarrhea magnesium peroxid has proved reliable.

Regulation of the diet in diarrhea gastrica is not so important as in other diseases of the stomach. A protein diet is most suitable in fermentative diarrheas, but where there is hyperacidity with

pancreatic and biliary insufficiency fats are restricted and bile stimulated with roast meat and eggs.

In *carcinoma* control of the diet is important and only foods which cause the least irritation and pain are permitted, and then in small quantities at short intervals.

Where there is *gastric atony* and the treatment outlined fails, outdoor exercise, massage, electric vibratory treatments, gastric lavage, and hydrotherapy render valuable assistance. When enterocolitis is troublesome, boric acid 4, ichthyol or balsam of Peru 2 per cent. colonic irrigations alternated with olive oil and bismuth high enemas are useful.

Antidiarrheal remedies fail to control movements and are contraindicated except opium extract, gr. $\frac{1}{4}$ (0.015), and belladonna extract, gr. $\frac{1}{8}$ (0.008), hypodermically or by mouth when evacuations are frequent and abdominal pains and cramps are distressing.

Diarrhea incident to *gastric ulcer* requires rest in bed, a fluid diet reinforced by nutritive enemata, opiates for pain, astringents, and sedatives, or where rest, hygienic, dietetic and medicinal measures fail one resorts to *gastro-enterostomy*, *gastroduodenostomy*, or *pyloroplasty*.

Carcinoma terminates fatally except when the growth is excised, and *palliative* treatment is indicated only in inoperable cases, and consists in preventing fermentation and administering opiates alone or in conjunction with antiseptics, astringents, and styptics to control pain, diminish evacuations, and minimize hemorrhage. In the presence of stagnation, distention from gas, and excessive fermentation relief in some instances quickly follows gastric lavage.

Diseases of the Small Intestine—Enterogenic Diarrhea, Dyspeptic Diarrhea, Lienteric Diarrhea.—*Dyspepsia intestinalis* occurs more frequently than supposed because diarrhea from this source is frequently attributed to gastrogenic disturbance or inflammatory lesions of the colon.

Enterogenic diarrhea may be due to diminished supply of biliary, pancreatic, or intestinal secretions, their prevention from being discharged into the duodenum owing to obstruction within the ducts, pathogenic changes in the mucosa that interfere with intestinal digestion and assimilation, imperfect mastication, and indiscretions in diet.

Functional and organic diseases that minimize [or increase] the gastric, pancreatic, or biliary fluid or alter their relation are frequent causes of enterogenic dyspeptic diarrhea and impaired

circulation, anemia, changes in the mucosa, duodenal ulcers, multiplication of bacteria and their toxins, and neurogenic disturbances have induced the condition.

The **symptoms** of enterogenic dyspepsia vary and are modified in accordance with the degree of complicating gastric disturbance when present, type of intestinal indigestion inciting the trouble, part played by gastro-intestinal catarrh, and the general health of the patient.

Loose movements, distention, borborygmi, flatus, abdominal discomfort, and pain are pronounced, and stools are acid, frequent, fluid, cause burning and tenesmus in the rectum and irritation to the perianal skin, and contain an abundance of mucus.

The **diagnosis** is not easy. In some instances the history will throw some light on the case, but usually reliance is placed on gastric and fecal analysis following *test-meals* to determine the part played by unbalanced gastric, biliary, or intestinal pancreatic juices, and if there is imperfect protein, carbohydrate, or fat digestion. Mucus, pus, or blood in the stools indicate organic changes in the mucosa.

The **treatment** is largely dietary and certain types of food are interdicted or limited and others increased.

In fermentative diarrhea and gas distention vegetables are discarded for eggs, soups, jellies, gelatins, gruels, and sour milk.

When frequent evacuations result from putrefaction, calomel, gr. ij to iij (0.12–0.18), in broken doses, or ichthyol, mv (0.30), in combination with charcoal, chalk, or bismuth are employed, but when diarrhea is not controlled morphin, gr. $\frac{1}{4}$ (0.015), with belladonna, gr. $\frac{1}{8}$ (0.008), are prescribed.

When dyspepsia intestinalis is due to imperfect starch digestion takadiastase, gr. v (0.30), brings relief, but when caused by meat indigestion and fats, pancreatin, gr. v (0.30), is preferable.

Duodenal require about the same treatment as gastric ulcers previously discussed.

Diseases of the Nervous System—Neurogenic Diarrhea, Nocturnal Diarrhea, Constipation, Colic, and Indigestion.—Neurotic individuals frequently suffer from irregular bowel movements.

Occasionally in this class of cases *constipation* or *obstipation* prevails for a time to give way alternately or continuously to *diarrhea* when the nervous mechanism is interfered with through the brain, intestinal nerve endings, or reflex phenomena.

This type of evacuations occurs more frequently in men than women and at any age, but is met with most often between

twenty-five and fifty, or time of life when the patient undergoes his greatest mental and physical strain is inclined to indulge in excesses, has a sedentary occupation, or is confined to poorly lighted and ventilated quarters, which cause suboxidation, a forerunner of nervous disturbances.

Nervous diarrhea is characterized by its sudden onset, periodicity, rapid succession of evacuations, extreme fluidity of movements, with exception of the first, which may be semisolid or firm, and is most often encountered in emotional, neurasthenic, or hysteric subjects. It is conceded frequent movements in these cases are caused by *hyperperistalsis*, *accelerated transudation* of fluid into the bowel, or *hypo-absorption*, one or all resulting from abnormal impulses originating in the cerebrum, general nervous system, or intestinal nervous plexuses.

Undoubtedly the intestinal nerve apparatus in the gut wall directly influences motility, secretion, and absorption, and functioning power of the gut is stimulated or inhibited by disease within it affecting nerve endings, and constipation or diarrhea result accordingly as impulses change.

Psychic diarrhea or *constipation* may be brought on by profound emotions, sudden fright, anxiety, anger, public speaking, trying a case before judge or jury, acting a play for the first time, taking an examination, being grilled upon the witness stand, excitement attending a journey, or being aware of the fact that there will be no opportunity to evacuate the bowel for a given time.

There is a peculiar form of nervous diarrhea which occurs during or immediately following the consumption of food.

Reflex disturbances are at times responsible for attacks of nervous diarrhea, and stimulating impulses may originate in the brain, intestine, or peripheral parts.

Occasionally healthy individuals are attacked with diarrhea where stools are frequent, watery, and occur in rapid succession following *exposure* to *cold*, sitting on damp steps or the ground, swimming in cold water, or getting wet feet.

Diarrhea is frequently associated with or caused by disease of the *male* and *female genital organs*.

The author has also treated patients suffering from a sensitive or *hysteric* rectum in whom an attack of diarrhea or constipation could be moderated by the introduction of a proctoscope or application of soothing medicines to the mucosa.

Diarrhea complicating *epilepsy* usually occurs during *crises* which are generally preceded by a rise in temperature and restlessness.

Intestinal auto-intoxication may influence frequency of the evacuation in constipation where toxins are retained, or diarrhea where fluidity of the stools and erosions of the mucosa favor entrance of poison into the circulation.

In *tabes dorsalis* the constipated state may obtain throughout, alternate with diarrhea, or in exceptional instances the latter may prevail during intestinal crises and be accompanied by abdominal pain, rectal tenesmus, and frequent exhausting watery evacuations.

The author has observed several patients who suffered from tenesmus and abnormally frequent semisolid or liquid movements caused by *hypersensitive areas* located in the sigmoid flexure and rectum, which independently or when stimulated by feces incited an imperative desire to stool. He has also treated a number of children and adults who were troubled with loose movements which were *involuntarily* discharged with urine, traceable to *injury* or *disease in spinal nerve centers* controlling the musculature of the rectum and bladder.

Symptoms.—The manifestations of neurogenic diarrhea differ from other types in the following ways: Diarrhea occurs in psychically disturbed or highly strung persons or those afflicted with functional or organic nerve diseases. Attacks are periodic, of sudden onset, and movements are watery, occur in early morning, vary from five to twenty daily, and contain mucus and no pus or blood.

Where gastric irritation predominates vomiting is annoying and evacuations contain undigested food, mucus, and bile. Some patients complain slightly of pain, but others, although there are no lesions in the mucosa, suffer from colic and intestinal soreness.

Diagnosis.—In typical instances with the above characteristic symptoms nervous diarrhea is diagnosed with comparative ease, but in obscure cases it is often difficult to differentiate between *neurogenic* and diarrhea induced by catarrhal or specific lesions of the colon and rectum, gastrogenic, and enterogenic diarrhea.

Membranous colitis is most often confused with neuropathic diarrhea because patients are *nervous*, but is distinguished from it by frequent attacks of enterospasm, obstipation, and presence of mucous casts or shreds in the evacuations.

Other forms of colitis because of exhausting discharges, loss of blood, and accompanying toxemia cause rapid emaciation and loss of weight, sallow complexion, anemia, anorexia, furred tongue, weakened rapid pulse, marked gastro-intestinal disturbances, and other signs of greatly impaired health, all of which manifestations

may be absent or minimized in neurogenic diarrhea, which usually occurs in comparatively healthy individuals owing to the fact that nutrition is disturbed to a lesser degree.

In diagnosing neurogenic diarrhea the author relies chiefly on the sudden onset and periodicity of attacks, fluidity of stools, rapid succession of watery evacuations occurring in the *early morning*, manifestations of organic or functional nerve disease—hysteria—tabes, exophthalmic goiter, etc., evidence of psychic emotion together with an analysis of the feces and a careful digital and proctosigmoidoscopic examination of the bowel, the findings of which are negative.

Treatment.—Before outlining the treatment it is necessary to determine whether diarrhea is *neurotic*, due to intestinal lesions, or both. When hysteria, neurasthenia, or other nervous disorders are responsible for frequent movements or constipation they are corrected, otherwise a cure is not accomplished. More is effected with psychotherapy and physical measures in building up the general health than by the administration of drugs, which temporarily quiet the nervous mechanism; it is necessary for the physician to maintain a cheerful disposition and encourage these patients. The author treats the bowel with soothing oils, sprays, and topical applications, which is the *sine qua non* of the treatment, since it eases the patient's mind and convinces him something is being done to effect a cure.

Some individuals recover at home, while others improve more quickly in a sanitarium.

The diet is liberal but nutritious, and the patient is advised against eating food difficult to digest or that irritates the stomach or intestine, and drinking alcoholic, iced, or carbonated beverages, which increase fluidity of movements.

In some instances a cold girdle applied to the abdomen in intervals between attacks makes the patient feel better and strengthens the abdominal and intestinal musculature, but during crises, when there is griping and soreness of the intestine, cold should be displaced by hot applications which diminish pain and irritability.

When heat is not effective and evacuations are exhausting relief is obtained from hypodermic injections of morphin, gr. $\frac{1}{4}$ (0.015), and atropin, gr. $\frac{1}{100}$ (0.0006). Astringent remedies are contraindicated because unreliable, and they may aggravate the condition by interfering with digestive ferments; arsenic, iron preparations, and nutrient emulsions are helpful.

In some instances veronal, trional, or sulphonal, gr. xv (0.97),

and bromid of soda, gr. xxx (1.95), are indicated to quiet nerves and procure needed sleep.

Nothing is expected from antiseptics or astringents serviceable in other types of diarrhea unless putrefaction or enterocolitis are troublesome.

In neurogenic subjects having simple catarrh relief is derived from a normal saline or sulphate of magnesia, \mathfrak{z} ss to j (15-30), to water Oij (1000) irrigations, but when there are erosions or ulcers in the mucosa warm mild antiseptics or astringent solutions—boric acid 4, ichthyol or salicylate of soda 2 per cent. irrigations are effective unless enterospasm is troublesome, when they are alternated with warm oil poured into the colon through a sigmoidoscope with the patient in the inverted posture, which soothes the inflamed mucosa and allays intestinal muscular irritability.

Chapter LXXVIII

Sundry Diseases

RESULTANT GASTRO-INTESTINAL AND RECTAL DISTURBANCES

Diarrhea from Irregularities in Living.—Meals to be properly digested should be taken at regular hours and eaten slowly amid pleasant surroundings. It is not surprising that individuals who eat more than they need at any time of highly seasoned or undigestible foods suffer from gastro-intestinal disturbances and diarrhea, because organs are overworked and constantly irritated, particularly when meals are hurriedly eaten and food is improperly masticated or consumed very hot or ice cold.

Digestion is frequently interfered with because large amounts of whisky, beer, tea, coffee, wine, or ice-cold water are consumed with food, which abnormally dilutes it, sets up fermentation, or irritates the mucosa.

The **symptoms** in this type of diarrhea are about the same as those accompanying catarrhal enteritis, elsewhere described.

The **diagnosis** is made by learning if the patient is a gourmandizer, leads an irregular life, eats undigestible food, and examining the gastric content and feces following Schmidt's test-meal.

The **treatment** consists in having the patient abstain from alcohol, establish regular hours for sleeping, eating, and attending to the calls of nature, limiting the amount of food consumed, and restricting the diet to food known to agree with him. Gastric and intestinal lavage afford considerable relief, but when diarrhea persists an opiate, sedative, antiseptic, or astringent, alone or in combination, must be prescribed to control diarrhea.

Diarrhea Cathartica.—Diarrhea is frequently a sequel of chronic, atonic, spastic, and mechanical constipation resulting from recurring fecal impaction through trauma or action of retained toxins, inflammation, ulceration, or continual employment in increasing dosage of laxatives, cathartics, and purgatives, which through their general effect and local irritation cause transudation of fluid into the intestine, increase glandular activity, and induce inflammation of the mucosa, causing gastric or enterocolonic catarrh.

The **treatment** of diarrhea cathartica embraces the discontinuing of medical agents responsible for the trouble, or using them

in smaller amounts and selecting drugs that induce a minimum gastro-intestinal disturbance. When urgent, antidiarrheal remedies may be judiciously prescribed until the catarrh of the bowel has been corrected.

Diarrhea in Hypodynamia Cordis.—Occasionally elderly patients complain of heart fatigue and suffer from diarrhea or spastic constipation that does not respond to cathartics and laxatives. Hot fomentations to the abdomen in conjunction with belladonna relaxes intestinal musculature and liberates accumulated feces. In other cases dislodgment of impacted fecal masses is accomplished through the administration of copious hot oil and soapsuds enemata which soften feces and lubricate the bowel.

Diarrhea from Burns.—The most interesting manifestation connected with very extensive burns is the formation of duodenal and gastric ulcers, which sometimes cause diarrhea or perforation and peritonitis.

The **treatment** of diarrhea complicating extensive burns is symptomatic and consists in relieving suffering by protecting the burn from air, puncturing vesicles, keeping parts submerged in water or covered with oil, applying antiseptic, soothing agents, skin-grafting, and prescribing antidiarrheal agents when necessary.

Diarrhea in Agoraphobia.—Loose movements occur in certain individuals when in large audiences from the fear that they will have to go to the toilet, and the impulse thus generated excites excessive peristalsis and even transudation of fluid into the intestine, causing fluid evacuations in rapid succession. The author has known cases where the patient temporarily lost control of movements.

The **treatment** of this and psychic diarrhea has been previously discussed under neurogenic diarrheal disturbances and needs no further elucidation here.

Diarrhea in Sitophobia.—Patients suffering from sitophobia fear to eat because of ill-effects they fear will ensue, and restrict their diet to such a degree that intestinal secretions are not stimulated, malnutrition ensues, and the bowel becomes irritable and evacuates the improperly digested food before absorption occurs.

The **treatment** of sitophobic diarrhea is psychic and consists in encouraging the patient, gradually increasing the amount of food until a normal diet has been established, and prescribing medicine that will quiet nerves and procure sleep.

Diarrhea from Chilling.—Increased evacuations is a disturbing manifestation of "chilling" brought on by exposure to cold or dampness where there is a sudden lowering of surface temperature

over a portion or the entire body accompanied by contraction of cutaneous blood-vessels, which leads to congestion of the intestine and viscera, favoring an increased secretion of mucus similar to that observed in attacks of coryza.

The **treatment** of diarrhea from chilling is mainly prophylactic, but once contracted, symptomatic measures are indicated—rest in bed, hot drinks, applications made to the abdomen, and a mustard foot bath. When the chilly sensations continue, Dover's powder, gr. v (0.30), and quinin, gr. ij (0.12), administered every three or four hours is effective. If the patient suffers from cramps or aching pains, opium, gr. $\frac{1}{2}$ (0.03); belladonna extract, gr. $\frac{1}{8}$ (0.008), or phenalgin, gr. x (0.60), are serviceable. Warm high saline or medicated colonic irrigations are also useful because of the soothing effect of heat on the mucosa and cleansing action of the fluid.

Diarrhea from Drinking Water and Cold Beverages.—Drinking quantities of water and iced drinks during summer stimulates peristaltic contractions and glandular secretion, thereby increasing fluidity of the intestinal contents and diluting gastro-intestinal secretions which interferes with digestion.

In certain communities, particularly Texas and New Mexico, the earth contains alkali that contaminates water and springs, which when drunk by a person unaccustomed to it induces persistent exhausting diarrhea. Drinking-water containing other minerals, vegetable matter, parasites, and refuse or excreta is often responsible for this condition.

The **treatment** consists in having patients drink less water at a moderate temperature, and when diarrhea is due to impure water it should be boiled or discarded, following which, if loose movements continue, they are controlled by usual antidiarrheal remedies in conjunction with bowel irrigation.

Diarrhea from Sun and Heat Strokes.—Diarrhea, nausea, vomiting, headache, vertigo, delirium, loss of consciousness, stercorous breathing, coma and rectal or vesical incontinence, or suppression of urine often complicate sunstroke, attacks workers in buildings exposed to high temperature—glass works, foundries, and boiler rooms—and may come on suddenly, gradually, or be preceded by loss of weight, weakness, dizziness, cramps, severe headache, disturbed vision, dry skin, rectal and vesical irritability, but when it reaches a climax there is diarrhea, hyperpyrexia, burning skin, delirium, and convulsions.

The **prognosis** is more favorable in heat- than sun-stroke.

The **treatment** is largely prophylactic and consists in having the patient avoid violent work in the sun or hot room, iced drinks,

or excess of fluids. Temperature is reduced by placing the patient in a cool room or bath and applying cold packs. Inhalations of amyl nitrite are helpful and when the patient has slightly recovered he is placed on a light or fluid diet. Cramps and diarrhea are relieved with opium and antidiarrheal remedies.

Senile Diarrhea.—Elderly individuals are often afflicted with constipation because of imperfect digestion and defective peristalsis, and feces are retained to form single or multiple compact masses that incite stercoral diarrhea.

Treatment embraces regulating the diet, giving an after-dinner pill to open the bowel, and administering castor oil and high colonic and soapsuds or oil enemata to soften fecal accumulations so that they may be evacuated. When fecal masses are large, hard, and located in the sigmoid flexure or rectum they are quickly removed through the sigmoidoscope by breaking them up with a gouge and washing them out by continuous irrigations.

Diarrhea Nocturna.—The caption “diarrhea nocturna” is employed to indicate a type of loose movements wherein stools are watery, rapidly follow each other, and occur in the early morning between 2 and 5 o'clock when the patient should be resting quietly in bed. Treatment of this condition has been previously outlined when dealing with neurogenic diarrhea.

Eosinophilic Diarrhea.—Neubauer and Stäubli have described this type of acute diarrhea with marked constitutional symptoms in which the mucosa was highly inflamed.

Charcot-Leyden crystals in the stools with increased eosinophils in the blood indicate parasitic infection of the small or large intestine.

The treatment is local and general.

Mechanical Diarrhea.—Mechanical irritants stimulate the mucous glands to excessive activity and increase frequency and strength of peristaltic movements, thereby causing diarrhea. Foreign bodies, enteroliths, gall-stones, intestinal sand, scybalæ, impacted fecal masses, and mineral or metal dust have most frequently induced loose movements.

The treatment consists in eliminating the source of irritation and treating the patient as if he had catarrhal enteroliths.

Diarrhea in Reflex Disturbances.—Diseases or injury to the brain, spinal cord or nerves, and disease in organs remote from the bowel may under favorable circumstances lead to watery evacuations with anal incontinence, and emotional disturbances have frequently caused diarrhea. Surgeons have often succeeded in curing *chronic reflex* diarrhea by operating and removing the cause

of the irritation to the local or general nerve mechanism which, through reflex disturbances, were responsible for diarrhea.

Diarrhea from Acute Embolic Enteritis and Colitis.—Like other organs the intestine or its mesentery may be involved by *hematologic emboli* in the presence of ulcerative endocarditis, anthrax, sepsis, angina pectoris, fibrinous pneumonia, and pyrogenic processes.

The method of **diagnosing** and locally **treating** embolic enterocolitis resembles that of ulcerative and phlegmonous entamebic colitis discussed elsewhere.

Coprostatic Diarrhea.—Stercoral or coprostatic diarrhea may be acute or chronic and complicate *atonic*, *spastic*, or *mechanical* constipation—obstipation.

Loose movements are induced by: (a) trauma to the mucosa; (b) local irritation and auto-intoxication incident to the retention, multiplication of the intestinal bacteria, and absorption of their toxins; (c) stercoral ulcers which expose nerve endings to intestinal stimuli; (d) psychic disturbance—impulses; (e) the formation of irritating gases, and (f) cathartics prescribed to soften evacuations and prevent obstruction. For a comprehensive study of fecal impaction—coprostasis—the reader is referred to Chapter XC, devoted to the subject.

Diarrhea in Obesity.—Obese individuals are often gourmands, eat frequently, at irregular hours, partake of highly seasoned foods, and imbibe alcoholics to excess, and thereby overtax the gastro-intestinal tract, impair the circulation, cause engorgement of the liver, and disturb the body equilibrium. The writer has treated a number of fat persons for irritable gastro-intestinal catarrh who suffered from pain, cramps, and watery movements.

Diarrhea may also occur in the obese, caused by constipation and accumulation of feces, which incite frequent movements or fatty degeneration of the liver.

There is a wide variation in diet lists submitted by different authorities for preventing the formation of and getting rid of surplus fat, as will be seen by study of the itinerary arranged by Bantong, Ebstein, Oertel, the author,¹ and others.

Treatment.—Best results are obtained by having these patients eat at regular hours, consume less food and water, abstain from alcoholic beverages, condiments and appetizers, exercise in the open air, refrain from eating sweets, farinaceous foods, fats, and fluids except in very limited quantities, and prescribing thyroid extract, gr. j (0.06), three times daily.

¹ Gant, *Diarrheal, Inflammatory, and Parasitic Diseases of the Gastro-intestinal Tract*, W. B. Saunders Co.

Complicating gastro-enterocolitis is controlled by regulating the diet, flushing the bowel with mild saline antiseptic and astringent solutions, and administering opiates, antiseptics, and astringents alone or in combination to diminish the number of stools.

Cachectic Diarrhea.—Diarrhea associated with cachexia is frequent, but should be considered as a manifestation of cancer, tuberculosis, pus accumulations, kidney lesions, or other serious affection where cachexia is a symptom.

The **treatment** of diarrhea in cachexia consists in correcting the condition responsible for frequent evacuations.

Anemic Diarrhea.—Frequent evacuations are encountered less often than constipation in anemic subjects, and when present the intestinal mucosa is inflamed and sensitive, evacuations are independent of digestive disturbances, and usually occur in the later stages of the disease.

Treatment.—When gastro-intestinal manifestations are part of the general anemic process, supportive measures—fresh air, nutritive food, regular hours, and exercise in combination with iron, arsenic, or strychnin—are indicated. When anemia or chlorosis is the result of intestinal lesions that bleed, bismuth subnitrate, guaiacol, and tannalbin are prescribed because they favor healing and lessen intestinal toxemia.

Beneficial results follow daily flushing the bowel through an appendical or cecal opening or *per anum* with a normal saline, boric acid 4, or ichthyol 2 per cent. solution, and making topical applications of silver nitrate 6, ichthyol 20, or balsam 20 per cent. to ulcers.

The author has obtained remarkably good results with through-and-through irrigation in the treatment of chlorosis, ordinary and pernicious anemia following his *ileocecostomy* (Fig. 993) and colonic irrigation, demonstrating that auto-intoxication is an important factor in anemia or that there is some pathologic relation between the bowel and this condition.

Diarrhea in Pernicious Anemia.—Gastralgia, abdominal pain and diarrhea are frequent complications of pernicious anemia due to hypochlorhydria or achylia gastrica that prevails.

Symptoms are controlled by opiates, rest in bed, fresh air, nourishing food, and Fowler's solution, \mathfrak{mij} to v (0.20–0.30), three times daily. The author has obtained good results from frequent medicated colonic irrigations following *appendicostomy*.

Leukemic Diarrhea.—This affection involving the bowel may induce costiveness or diarrhea and pasty dark-brown stools.

The **treatment** of leukemia and pseudoleukemia is unsatis-

factory. Iron and arsenic in conjunction with intestinal antiseptics are serviceable in controlling diarrhea, but when they fail an opiate, irrigations, and topical applications are indicated.

Surgery has been resorted to in this class of cases, but results have been disappointing.

Alcoholic Diarrhea.—In acute alcoholism catarrhal gastroenteritis and diarrhea are of short duration.

Chronic alcoholism affects the general system, stomach, intestines, liver, and other organs, producing the *symptom-complex*—anorexia, abnoxious breath, morning vomiting, gastric discomfort after eating, insomnia, headache, restlessness, depression, dementia, and delirium tremens, impaired metabolism and constipation alone or alternating with diarrhea, or the latter may prevail.

Diarrhea in these cases results from the thickened, inflamed, congested, or ulcerated intestinal mucosa, indigestion, interference with colonic absorption, disturbance of biliary circulation, and effect of alcohol on local and cerebrospinal nerve-centers controlling intestinal nutrition, secretion, and motility.

Treatment consists in prohibiting drinking, keeping the patient on a liquid diet, washing out the stomach, flushing the bowel, prescribing remedies that will relieve headache and insure sleep.

Diarrhea improves in proportion as alcohol is diminished and congestion of the mucosa becomes less; but in chronic inebriates there persists a chronic catarrhal *enterocolitis* that requires special treatment.

When enterocolitis and diarrhea dominate the *symptom-complex*, opium, gr. $\frac{1}{2}$ (0.03), and belladonna, gr. $\frac{1}{8}$ (0.008), alone or in combination with bismuth, gr. x to xx (0.60–1.30), or tannoform, gr. v to x (0.30–0.60), are indicated.

When fermentation and putrefaction are marked, calomel, salol, beta-naphthol, and colonic lavage are indicated.

Flaxseed tea, starch or slippery elm water, and mild infusions of black or white oak bark, agents which soothe the bowel, reduce inflammation, and heal erosions of the mucosa are employed when enterocolitis is troublesome. In severe cases where diarrhea is persistent and stools contain pus, blood, and mucus, stronger irritants, boric acid 4, or ichthyol 12 per cent., containing laudanum, ʒxx (1.30), and tincture of belladonna, ʒx (0.60), are preferable.

Marasmic Diarrhea.—Diarrhea is encountered in marasmus more frequently and severely when it develops rapidly. Stools resemble those of enterocolitis or may be watery when transudation

is marked due to disturbed intestinal nervous mechanism, lack of absorption, or impairment of the local circulatory apparatus.

The **treatment** is based on improved feeding, nerve and systemic tonics, fresh air, sunshine, remedies that alleviate intestinal catarrh, and irrigations to heal the inflamed or ulcerated mucosa.

Diarrhea in Arteriosclerosis.—Arteriosclerosis of mesenteric vessels is sometimes complicated by colic, gastro-intestinal symptoms, and cholera-like diarrhea. In such cases *treatment* is the same as for general arteriosclerosis with enterocolitis.

Diarrhea in Enteritis Crouposa Necrotica.—This condition is characterized by extensive sloughing and ulceration of the intestine accompanied by diarrhea irrespective of the cause of the disease. Sloughing and loose movements may be secondary to *nephritis*, *mercurial poisoning*, *bacillary*, *balantidic*, or *entamebic colitis*, *intestinal obstruction*, *final stages of wasting diseases*, *diphtheria*, or *pneumonia*.

Local **symptoms** simulate other forms of ulcerative colitis.

The **diagnosis** is made with aid of the sigmoidoscope and fecal examination.

The **treatment** consists in keeping the patient quiet, restricting the diet, administering opiates, and bismuth to comfort the patient and diminish stools, irrigating the colon from below or through an appendical or cecal opening, and in resecting the diseased gut when less radical measures fail.

Gouty Diarrhea.—Gout and rheumatism are more often complicated by constipation than diarrhea associated with flatulence, dyspepsia, pyrosis, and abdominal pains.

The **treatment** is symptomatic for gastro-intestinal manifestations, but treatment for gout is prescribed to prevent a recurrence of diarrhea.

Scorbutic Diarrhea.—Scurvy common among sailors who take long voyages is supposed to be induced by lack of fresh vegetables, toxic substances in the food, or an unknown specific organism.

It comes on insidiously and is characterized by loss in weight, bleeding gums, loose teeth, foul breath, swollen tongue, dry skin, ecchymosis, mental depression, and constipation or diarrhea.

Treatment.—It is cured by lemon juice daily together with wholesome meat and fresh vegetables and frequent mouth-washing with a weak permanganate or carbolic solution.

Diarrhea in Cerebrospinal Meningitis.—Gastro-intestinal complications are usually not annoying, but when they are, diarrhea occurs less often than constipation.

Compensatory diarrhea occurs when metabolism is interfered

with through organic changes or nervous disturbances resulting in an accumulation of secretory products that find exit through the bowel to cause diarrhea by irritation, increasing fluid in the feces augmenting intestinal secretion, and exciting peristalsis, a condition most often met with in the aged in whom the emunctories are inactive.

Compensatory diarrhea complicates *burns*, *Addison's disease*, *diabetes*, *gout*, *exophthalmic goiter*, and *kidney lesions* more often than other affections.

The **treatment** varies according to the organ involved and consists in employing measures that will normalize metabolism and counteract the effect of toxins when movements are frequent, offensive, and exhausting. For simple or ulcerative enterocolitis diarrhea is controlled by medicated irrigations, antidiarrheal agents, and remedies that allay pain and procure sleep.

Amyloidosis.—Lardaceous degeneration of the intestine, particularly the lower bowel is rare and most often associated with chronic infections, tuberculosis, lues, or degeneration of the kidney, liver, or spleen. Lardaceous ulcers of the colon may be single or multiple, have a punched-out appearance, pale at base, and smooth, raised edges brought about through action of the disease upon vessels.

Symptoms are indefinite, but in the presence of intestinal ulcers the usual manifestations of chronic colitis are observed.

A *diagnosis* is arrived at through obtaining a history of chronic infection, tuberculosis, or syphilis elsewhere, detecting an enlarged boggy kidney, liver, or spleen, examining the rectum and sigmoid for ulcers through the proctosigmoidoscope, and applying iodine to the mucosa, which turns it reddish brown, or sulphuric acid, which gives it a bluish or violet hue.

The **treatment** of intestinal lardaceous degeneration depends on its causation and is often symptomatic. When amyloidosis is limited to a segment of gut it should be *excised* or *short-circuited* unless the patient is too ill or refuses surgical intervention, under which circumstances hygienic measures, tonics, antiseptic and healing agents are prescribed according to indications.

Actinomycosis.—This affection, frequent in animals, caused by the *ray fungus*—*Streptothrix actinomycosis*—occasionally involves the abdomen and intestine, most often originating in the appendix or cecum, and secondarily attacks the anorectal region.

The fungus gains entrance to the body through food—raw grain—and first appears as an exudate that agglutinates adjacent viscera or forms a glandular tumor that ruptures through the abdominal

wall or gut, causing fistula. *Rectal* actinomycosis is usually evidently infiltrated.

Symptoms are obscure, but in aggravated actinomycosis constipation alternating with diarrhea, proctocolitis, obstructive manifestations, and a discharge of pus are the most common manifestations, pain rarely being troublesome.

The **diagnosis** is difficult and based on characteristic manifestations, firm tumor, massing of intestinal coils, and finding of actinomycotic granules in pus or feces.

Prognosis is usually grave, only 20 per cent. of actinomycotic subjects having been cured.

Treatment is surgical and consists in excising all foci except where removal of the mass is impracticable, in which case numerous cuts are made in it, through which the fungus escapes.

Pellagra—maidismus—fairly common in Southern States, is often associated with anebic colitis.

While the etiology is not clearly understood, it is known that the disease usually occurs in cornmeal eaters, and that such food is contaminated by bacteria.

Pellagrins exhibit troublesome neurogenic and gastro-intestinal symptoms—gastro-enteritis complicated by pyrosis, nausea, vomiting, tympanites, coated tongue, troublesome diarrhea, dermatitis on the back of fingers, hands, and wrists, cachexia, proctitis, indicanuria, and discharge of pus, blood, or mucus.

Treatment is not always effective, though good results have followed rest, a liberal well-selected diet, and administration three times daily of Fowler's solution, mv to xx (0.30–1.30), reinforced with dilute hydrochloric acid and colonic irrigation (ichthyol 2 per cent.) when mucosa is ulcerated and diarrhea aggravated to prevent recurrence, meal and other food-stuff must be prevented from contamination.

Chapter LXXIX

Miscellaneous Contagious, Infectious, and Tropical Intestinal Diseases

Diarrhea in Acute Contagious Diseases.—Affections of this class are temporarily complicated by enterocolonic manifestations more often than conceived, since they are responsible for neurogenic disturbances or enterocolitis that induces constipation, diarrhea, or other intestinal disturbance that continues following their recovery.

Measles, scarlet fever, varicella—chicken-pox—variola—small-pox, whooping-cough—pertussis—and diphtheria (Fig. 413) may through accompanying sepsis formation and absorption, or virulent toxins, neurogenic phenomena, constitutional disturbances, or paralysis cause intestinal lesions or serious manifestations, particularly diarrhea, and the evacuation of mucus and blood is an indication that the patient is in a dangerous condition.

Influenza is frequently complicated by inflammation of the intestinal mucosa, abdominal discomfort, diarrhea, and stools containing mucus.

Pneumonia occasionally leads to gastro-intestinal disturbances and loose movements through the action of generated toxins or emigration of *pneumococci* to the bowel.

The **treatment** of contagious disease complicated by diarrhea or other intestinal manifestations necessitates rest in bed, a restricted diet, and medication to control stools, regulating the temperature, lessening toxemia, healing the inflamed bowel, overcoming heart weakness, nervous depression, and mitigating pain. In addition, prophylactic measures are taken to prevent the disease from spreading, and antitoxin and other specific agents are employed as indicated.

ACUTE INFECTIOUS DISEASES

Diarrhea in Typhoid Fever.—Loose movements in this condition (Figs. 774–776) are due chiefly to ulcers or local irritant action of toxins generated within the intestine and toxemic condition of the patient.

Enteric fever movements may vary from two or three to a dozen daily; stools are yellow, mushy, and later thinner, resembling

purée of peas, are alkaline in reaction, have a characteristic odor, and when left standing solid matter settles. During crises evacuations may contain sloughing tissue and blood in small or large amounts.



Fig. 774.

Fig. 774.—Typhoid fever:
Appearance of mucosa, first
week.

Fig. 775.

Fig. 775.—Typhoid fever:
Appearance of mucosa, sec-
ond week.
(Army Museum.)

Fig. 776.

Fig. 776.—Typhoid fever:
Appearance of mucosa,
third week.

The diagnosis is based on symptoms excluding other diseases and Widal's reaction.

Treatment consists in prescribing rest and a suitable diet, medication, colonic irrigation, according to indications.

Diarrhea in Yellow Fever.—This acute infectious disease (Fig. 777), which formerly destroyed many lives in the Southern States, Cuba, etc., has been almost eradicated by improved sanitation and isolating patients having the fever.

The disease is characterized by *jaundiced skin*, *anemic liver*, *friable pancreas*, *nephritis*, *glandular enlargement*, *acute enterocolitis*, and *hemorrhages*.

The **symptoms** are anorexia, headache, chill, high fever, aching in limbs, delirium, fast pulse, swollen gums, burning in stomach,



Fig. 777.—Yellow fever of the small intestine, showing capillary hemorrhages.



Fig. 778.—Appearance of the mucosa in Asiatic cholera.

nausea, black vomitus, and later weakness, jaundice, collapse, hemorrhages, fast pulse, dry tongue, suppression of urine, and uremic convulsions or coma in fatal cases.

Prognosis.—The death-rate may vary from 1 per cent. in light to 10 per cent. in mild, and 30 to 50 per cent. in severe forms of the disease.

Treatment consists in prophylaxis, guarding against the *Stegomyia fasciata*, having the patient rest in bed, remain on a light diet, stimulating emunctories, applying ice to the stomach, and administering sodium bicarbonate, gr. x to xx (0.65–1.30),

administered in Apollinaris water to diminish acidity of the secretions.

Diarrhea in Relapsing Fever—Febris Recurrens.—This affection is caused by *spirochetes*, and characterized by attacks of fever which last a week and subside, to recur in about the same time.

Relapsing fever is sometimes complicated by gastric disturbances, but diarrhea is a rare complication of the affection.

The **treatment** consists in hygienic measures, having the patient remain quiet while temperature is high, regulating the diet, and giving an opiate to relieve pain in the limbs.

Diarrhea in Cholera.—Ravages from cholera (Fig. 778) are not nearly so disheartening as formerly because health boards have learned how to prevent and control it. It is caused by the comma bacillus of Koch—*Vibrio cholerae Asiaticæ*—which is found in evacuations. In severe cases the patient complains of nausea, abdominal discomfort, later of active peristalsis, tenderness over the small intestine, characteristic diarrhea with profuse odorless, colorless, watery and painless stools showing a neutral or alkaline reaction, vomiting, dizziness, cramps, loss of appetite, thirst, dry tongue, mouth, and throat, weakened heart action, coldness, impaired circulation, livid skin, varying temperature, pinched expression, difficult respiration, partial suppression of urine, and general prostration.

When the patient survives manifestations gradually improve and stools become normal in frequency and consistence unless an enterocolitis remains, when the mucosa is inflamed, swollen, and irritable.

The **diagnosis** of cholera is apparent when epidemic, otherwise it must be differentiated from cholera morbus or choleriform diarrhea by examining the stools and finding comma bacilli.

The **prognosis** of cholera is usually grave, but occasionally infection is not virulent and the patient recovers.

Treatment.—Prophylactic measures consist in isolating the patient and disinfecting stools. Treatment consists in withdrawing irritating foods, administering calomel in broken doses to stimulate the liver, prescribing opium, gr. $\frac{1}{2}$ (0.03), to relieve cramps, water in abundance to replace that lost by transudation and diarrhea in conjunction with saline enteroclysis and gastric lavage.

Choleriform and cholerine diarrhea are regarded as mild forms of cholera, but have no entity, and these captions should be employed to designate the *intensity* of diarrhea where stools are frequent, thin, composed of transudated fluid, and resemble evacuations in Asiatic cholera.

Cholera morbus and **cholera infantum**, conditions encountered in adults and infants during extreme hot weather, are considered as infectious disturbances, though diarrhea resembling them has been caused by intestinal irritants and excessive putrefaction.

Streptococci, *colon bacilli*, *dysenteric bacilli*, and other organisms have been found in the stools of patients suffering from these affections.

The chief *symptoms* are: Vomiting, abdominal pain, tenesmus, exhausting diarrhea, thirst, weak pulse, and partial or complete collapse.

In making the *diagnosis* it is necessary to exclude cholera, amebic and bacillary colitis, ptomain poisoning, and other acute infectious intestinal diseases by isolating or making cultures of organisms causing the disturbance.

The **treatment** embraces rest, a fluid or light diet, water drinking, colonic irrigations of boric acid, 4 per cent., or ichthyol, 1 per cent., gastric lavage, and opium, gr. $\frac{1}{4}$ (0.015), and belladonna, gr. $\frac{1}{8}$ (0.008), as required, preceded by castor oil or calomel. Astringents and antiseptics are serviceable in some instances.

Winter Cholera.—*Intestinal flux*, occasionally encountered in crowded communities, has been attributed to polluted water containing *colon*, *Pfeiffer's*, *Shiga's* and *Enteritidis sporogenes bacilli*, and other organisms alone or associated.

Symptoms vary, but resemble those of cholera nostras, and the diagnosis is based on finding the inciting organism in the stools.

The **treatment** is *prophylactic* and *symptomatic*.

Septic diarrhea is not uncommon and results from local bowel infection, discharge of pus into the gut from other organs, or action of toxins upon nervous mechanisms where septic foci are located near or distant to the intestine. *Streptococci*, *staphylococci*, *pneumococci*, *colon bacilli*, *gonococci*, etc., are most often responsible for this type of diarrhea.

Briefly stated, the *symptoms* of septic diarrhea here are: anorexia, nausea, vomiting, icterus, frequent slimy evacuations containing blood and mucus or pus, and purpura.

The **treatment** consists in removing or draining septic foci unless infection is generalized, when *surgery* is reinforced by supportive measures, stimulating emunctories, water drinking, antiseptics, and administration of calomel or hydragogues to cleanse the bowel are indicated together with tonics, stimulants, and medicine to relieve discomfort or pain.

Erysipelas is frequently complicated by diarrhea and stools containing blood.

TROPICAL DIARRHEAS

In addition to *amebic* and *bacillary* colitis elsewhere discussed several other diarrheas bearing different names that are endemic in hot countries are occasionally met with in the United States.

Cochin=China Diarrhea.—Cochinchinitis, common in China, Borneo, and the Philippines, is believed to be an infectious disease. While the *Strongyloides intestinalis* are frequently found in the stools, there is little doubt but that *entamebæ* and *dysenteric bacilli*—Shiga's—are more often responsible for the condition.

The *symptom-complex* of cochininitis resembles that of enterocolitis except anemia is profound and evacuations contain but little pus or blood.

Sprue—*psilosis linguæ et mucosæ intestini*—common in India and China, is rare in this country. The *etiology* is unknown, but thought to be of an infectious nature.

Characteristic **symptoms** are a dry, sore, swollen mouth, furred tongue, and free secretion of acid saliva, followed by melancholia, digestive disturbances, vomiting, diarrhea with copious, foamy, offensive, pale evacuations, and eventually marked anemia and loss in weight.

The **diagnosis** is easy because of characteristic manifestations, but fecal examination is advisable to differentiate sprue from other tropic diarrheas.

Hill diarrhea is most often encountered in India and South America in persons who have resided on high mountains and moved to a lower *altitude*; the disease, which is complicated by anorexia, malaise, flatulence, dyspepsia, and diarrhea characterized by early morning watery, colorless, frothy evacuations, is probably caused by an infectious organism.

Diarrhea alba—*diarrhea chylosa*—**celiac disease**, most prevalent in young children, usually complicates digestive disturbances associated with catarrhal enterocolitis, though some authorities consider *Filaria sanguinis hominis* the causative factor in the condition.

Symptoms mimic those of other tropical diarrheas except stools are bulky, light colored, and resemble oatmeal porridge.

The **diagnosis** is based on the characteristic *foamy* evacuations and isolating *filaria*.

Treatment of Tropical Diarrheas.—Measures employed to control loose movements are the same as those practised for other diarrheas and, in addition, it is necessary to see that the patient does not consume contaminated water or food, keeps out of the

sun, changes altitude if necessary, and restricts his diet to milk, fluids, and non-irritating food.

In **sprue** comfort is derived from spraying the mouth with cocain, 4 per cent., and bathing ulcerated areas with mild astringent solutions. In aggravated cases, where the bowel is inflamed or ulcerated, colonic irrigations of ichthyol, 2 per cent., and thymol, gr. ij to v (0.12–0.30), daily by mouth are effective.

Pseudodysenteric diarrhea, frequent in Sumatra, is said to be caused by *pseudodysenteric bacilli*, which probably belong to the Shiga, Flexner, Hiss, or Harris types.

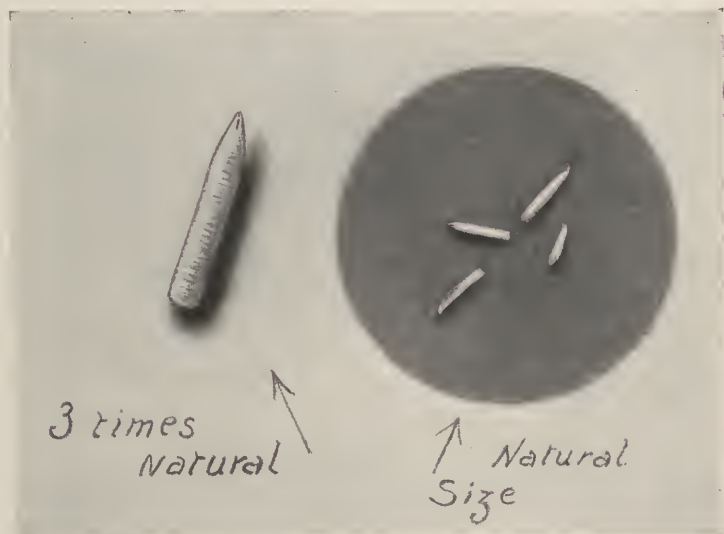


Fig. 779.—Intestinal myiasis. Note normal size of maggots on the right, and one magnified three times on the left. Detected in the feces of a patient suffering from intestinal indigestion.

Anthrax diarrhea is rare and recognized by finding bacilli in the form of *immobile sporiferous rods*. The characteristic manifestation of the condition is free fluid in the lower abdomen. Intestinal anthrax is hopeless.

Malaria, typhus fever, glanders, and the plague—black death—at one time or another are responsible for diarrhea that varies in character and severity, and may or may not be complicated by abdominal pain and hemorrhage.

Sutika, puerperal diarrhea, caused 228 deaths in Calcutta in a single year, and in 1700 deliveries 1.3 per cent. of puerperal women died of sutika. Diarrhea appears during the first two weeks, rapidly causes general prostration, edema of the lower extremities, and

death from exhaustion. Pathogenesis of the disease is obscure, since it differs from puerperal fever and amebic and bacillary colitis because of there being no mucus, pus, or blood in the stools.

Diarrhea from Intestinal Myiasis.—Disturbance caused by maggots (Fig. 779), common in tropical countries, is rare in America. Einhorn described to the author a case wherein the colon contained thousands of screw-worms (Fig. 779). Maggots penetrate the tissues, irritate the intestine, and induce **symptoms** similar to those induced by colonic ulceration.

Treatment consists in keeping flies—*Dermatobia cyaniventrix*—from the patient and irrigating the bowel with a strong ichthyol, carbolic acid, or turpentine solution.

El Bicho diarrhea, encountered in Brazil, is believed to be a form of amebic or bacillary colitis dysentery. The patient has a temperature, the bowel gives off a putrid odor, diarrhea is depressing, and there is bleeding caused by sloughing of the mucosa. Treatment is prophylactic and symptomatic.

Chapter LXXX

Focal Infection of the Colon, Sigmoid Flexure, and Rectum, and Its Relation to Systemic Diseases—Endocarditis, Arthritis, Nephritis, etc.

General Remarks.—Focal infection as a cause of systemic disease has been conceded for a long time, but it is only in recent years and largely due to the investigations of Miller, Billings, Rosenow, Davis, and Lane that the frequency and importance of the subject has been recognized, and the technic of diagnosing and methods of treating constitutional affections arising therefrom have been worked out.

There is now sufficient evidence at hand to warrant the statement that serious injury to different organs and structures accompanied by slight distressing or dangerous manifestations may be induced by *acute, latent, or chronic infective foci* located near to or distant from the structure or organ secondarily involved. Damage resulting depends more on virulence of the organism than size of the lesion.

While focal infection responsible for systemic disease may be located anywhere in the body, foci bringing about the condition are most frequently encountered in the head, teeth, jaw, accessory sinuses, antrum, nasopharynx, internal ear, throat, tonsils, lungs, due to empyema, pulmonary tuberculosis, or bronchial lymph-nodes; stomach or small intestine, the result of gastric or duodenal ulcer; liver, from amebic or other abscess; gall-bladder in cholecystitis; appendix, when suppurating; colon, sigmoid flexure, or rectum when inflamed, ulcerated, obstructed—stasis—or the seat of submucous abscess and fistulæ, pericolitis, periproctitis; female genitalia, involved by oöphoritis, salpingitis, metritis, vaginitis, or pelvic abscess; genito-urinary tract, in the prepuce, urethritis, vesiculitis, prostatitis, cystitis, pyclitis, or pyonephrosis.

Pus pockets beneath the finger and toe nails, mucosa of the alimentary tract, and the skin are responsible for secondary involvement of a general character more often than is believed, and the author has several times observed acute and chronic systemic disturbances due to local infection induced by unclean instruments used by manicures, chiropodists, and cosmetic specialists, injur-

ing the hand while dissecting or operating on pus cases, and superficial or deep needle punctures when the syringe had not been properly sterilized.

A *primary* focus at one point may lead to *secondary* infection at another, and both may then remain isolated, or independently, or in conjunction cause systemic disease.

Systemic and disease in special organs resulting from focal infection may be induced by pathogenic micro-organisms or their toxins transported to the affected part through the blood—*hematogenous*—or lymphatic streams—*lymphogenous*—some individuals possessing a higher degree of *immunity* against infective agents than others.

The extent of tissue destruction and severity of manifestations correspond with virulence of the bacteria and the body resistance, and not upon the size of the lesion, which is the source of infection responsible for constitutional disturbances.

Focal infection may be caused by a single or several pathogenic organisms, of which the following, named in order of their frequency and importance, are the chief infecting agents: *Streptococcus*—*longus*, *viridans*, *mucosus*, *fecalis*—*staphylococcus*, *pneumococcus*, *gonococcus*, *Micrococcus catarrhalis*, and *Bacillus influenzae*, *B. diphtheriae*, and *colon bacillus*.

The *streptococcus-pneumococcus* group, the organisms most frequently identified in cases of systemic disease secondary to focal infection, undergo transmutation in type and pathogenicity in accordance with the supply of oxygen.

When systemic disease arises from primary lesions located in the colon or rectum infection is usually mixed and chronic, and cultures made in this class of cases show that Gram-negative are more common than Gram-positive bacilli. In 50 cases of infection of the rectocolonic mucosa published by Soper cultures showed *streptococci*, *staphylococci*, *diplococci*, *colon bacilli*, and *Gram-negative* or *Gram-positive bacilli* alone or in combination in all cases.

Bowel and local infections elsewhere have presumably caused the following *acute* and *chronic* diseases: Rheumatic fever, endocarditis, chorea, systemic infection, *gonococcus arthritis*, appendicitis, cholecystitis, gastric and duodenal ulcer, erythema nodosum, herpes, spinal myelitis, osteomyelitis, thyroiditis, iridocyclitis, nephritis, myositis, neurasthenia, neuralgia—facial, sciatic, crural, lumbar, and intercostal—pancreatitis, pyelitis, cystitis, pneumonia, prostatitis, septicemia and pyemia, and has complicated tuberculosis.

A fairly large private practice and his clinics at Broad Street,

the New York Post-Graduate School, and Joint Disease Hospitals has provided the author with abundant material and unusual facilities for investigating rectocolonic infections and their frequency as a cause of systemic disease. His studies of this class of cases indicate that focal infections in the lower bowel are common, that local and constitutional diseases—heart, kidney, joint, and nerve—are frequently secondary to them, and that systemic affections can frequently be prevented, improved, or cured by eliminating colonic stasis, intestinal pus pockets, or lesions in the colon, rectum, or elsewhere containing pathogenic and pyogenic microorganisms.

Infected large or small areas often complicate chronic intestinal obstructions—ptosis, angulation, volvulus, extra-intestinal pressure, cecum mobile, invagination, or dilatation—associated stasis, fecal impaction and stercoral ulcers, and from these foci pathogenic organisms are carried to distant parts, producing systemic disturbances.

However, joint, heart, kidney, liver, and other diseases the result of *rectocolonic focal infection* are encountered much more frequently in patients afflicted with catarrhal, amebic, bacillary, balantidic, tubercular, and other chronic forms of colitis where the bowel is smeared with a mucopurulent secretion, is extensively ulcerated, or the mucous membrane is undermined by extensive large ulcers and connecting fistulous sinuses. Submucous, subcutaneous, ischiorectal, and perirectal abscesses may be the starting point of arthritis, septicemia, pyemia, and other of the above enumerated systemic diseases known to result from focal infection; less often ulcerated hemorrhoids, fissures, and anorectal fistulæ have induced similar results.

Diagnosis.—Focal infections should be sought when there are present manifestations of a disease with which they are frequently associated, though the diagnosis of focal infections is not always easy, since foci of infection may be small and deeply concealed.

In cases of constitutional disease supposedly the result of focal infection, after obtaining a careful history and thoroughly going over the patient—the nose, mouth, throat, lungs, stomach, intestine, colon, rectum, female genitalia, and genito-urinary tract are carefully examined with the object of locating a *poison nidus* that might account for systemic disturbances; the best results are obtained when there is *team-work* between the internist, specialist, surgeon, and bacteriologist.

However, the diagnosis should not be regarded as positive

unless streptococci, gonococci, pneumococci, or other bacteria sometimes responsible for systemic disease—arthritis, endocarditis, etc.—are discovered in the blood, or unless cultures made from pathogenic micro-organisms taken from *local bowel lesions* injected into animals produce like disturbances.

Treatment.—In the handling of systemic disease associated with or caused by focal infection therapeutic measures must be adopted to meet indications in different cases, since reaction, pathologic changes, resistance and virulence, and site of infection, both primary and secondary, vary.

Removal of the focus—diseased teeth, tonsils, tubes, prostate, ulcerated hemorrhoids, etc.—is the first and most important step in the treatment; this is sometimes impossible owing to inaccessibility or failure to locate the focus, and occasionally must be delayed owing to acuteness of manifestations or prostration of the patient which may contraindicate operative interference. When the patient is septic, anemic, and debilitated an attempt is made to strengthen his *bodily defense* independent of the removal of the infected foci; this is most quickly accomplished by having him lead a healthy outdoor life, restrict his diet to easily digested nourishing food, avoid social and business worries; take nerve, blood, and other tonics to build up the system. Perhaps the most useful agent for this purpose is *cacodylate of soda*, $\text{m}\nu$ to x (0.30–60), deeply injected into the tissues daily. Sufferers from streptococcic rheumatism do splendidly under *salicylic acid* in frequent and large doses, especially by rectum, since the drug possesses a specific bactericidal action. *Transfusion* is occasionally helpful in this class of cases.

Individuals relieved or cured of systemic disease secondary to focal infection are kept under observation a long time to insure against recurrence of the infection, and *institutional* usually recover more quickly than *ambulatory* patients.

Serum and Vaccine Therapy.—Antisera have not been universally effective in the author's cases of systemic disease induced by focal infection, because in most instances the disturbance was chronic, and sera are objectionable to the patient owing to pain and reaction accompanying and following their injection. In some cases sera obtained by immunizing animals or relatives willing to take the risk with strains of streptococcus, pneumococcus, or other organisms obtained from infected foci or the blood may be tried, but too much confidence should not be placed in them.

Inoculation occasionally strengthens natural defenses of the body in patients debilitated through infection, particularly when

autogenous vaccines are employed, which increase specific antibodies.

Billings says, "The final result was quite as satisfactory without as with vaccine in patients suffering with chronic infections, arthritis, and acute rheumatism. Patients suffering with chronic *Streptococcus viridans* endocarditis were not benefited by autogenous vaccines. Indeed, I believe some of them were made distinctly worse when moderately large doses of vaccine were used."

Good results have occasionally followed inoculation with autogenous vaccines, but the treatment failed in the majority of cases, and because of this the author relies chiefly on destroying infected foci and building up the patient with other therapeutic measures even and when vaccines or sera are also employed.

The intravenous injection of colon, typhoid, and other *non-specific protein antigens* have proved serviceable in acute rheumatism and chronic arthritis.

Treatment of Rectocolonic Focal Infections.—*Chronic intestinal stasis* causing or complicating auto-intoxication, arthritis, endocarditis, etc., is corrected by straightening angulations, kinks, and twists, severing adhesions, dividing Jackson's membranes, overcoming extra-intestinal pressure, excising tumors and strictures, plicating the bowel when dilated, and suturing the cecum and sigmoid flexure to the abdominal wall—cecopexy-sigmoidopexy—to correct cecum mobile, colonic ptosis, and invagination of the sigmoid flexure into the rectum.

Chronic colitis—catarrhal, amebic, luetic, gonorrheal, balantidic, bacillary, and tubercular—where the bowel is extensively ulcerated and complicated by submucous abscesses and fistulæ, is a frequent cause of systemic disease. Occasionally the affection responds to rest, restricted diet, administration of antiseptic and astringent remedies—salol, beta-naphthol, thymol, bismuth, argyrol—irrigation of the colon *per anum* with an ichthyol 5 per cent. solution, and use of sera or vaccines in suitable cases. Where this treatment fails, *appendicostomy* (Fig. 1006) or *cecostomy* (Fig. 994) is performed, so that frequent and copious through-and-through colonic medicated irrigations may be carried out daily, which serve to keep the bowel free of irritants, bacteria, and toxins, which hasten the healing of lesions.

In extreme cases, where the bowel is badly distorted, strictured, or the mucosa extensively sloughed, covered with polyps or riddled with ulcers, *colonic exclusion*, *ileosigmoidostomy* (Fig. 993), or *colostomy* may be necessary to put the bowel at rest and bring about

a cure; the *former* being preferable owing to the disgusting features of the *latter*.

Resection and colectomy (Fig. 971) are justified in rare instances where the colon is practically destroyed by tubercular and other ulcerative processes complicated by submucous abscesses, fistulæ, or polyposis (Fig. 957), undergoing malignancy.

Focal infection, common in the anorectal region, is easily overcome because the parts are accessible to diagnostic and operative procedures. Chronic, submucous, subcutaneous, ischio-, and perirectal *abscesses* and *fistulæ*, frequently responsible for systemic poisoning and disease, are eliminated by incision and drainage; *infected polyps* are removed by attaching a Gant valve clamp (Fig. 552) to or fulgurating their pedicles, which causes the polypi to drop off; *ulcerated hemorrhoids* are excised by the ligature method under local anesthesia; *fissures* are cured by incising them and the *sphincter*, and subsequently draining the cut with a gauze pledget; *strictures* are dilated, incised, or removed, and neoplasms are extirpated.

Ulcerative proctitis (Fig. 208) is treated in the same manner as colitis outlined above, except the treatment is reinforced by topical applications—silver nitrate, ichthyol, or balsam of Peru 6 per cent.—made to lesions; fulguration of sluggish ulcers having overhanging edges; insufflation of a dry powder composed of calomel 1 part and boric acid 2 parts, or nightly injection of the following emulsion: olive oil, ℥iij (90.0), and bismuth subnitrate, ʒj (4.0), are remedial agents that soothe the inflamed irritated mucosa and favor the healing of ulcers and erosions responsible for focal infection

Chapter LXXXI

Hemorrhage of the Stomach, Small Intestine, Colon, and Sigmoid Flexure

HEMOPHILIA, PURPURA HÆMORRHAGICA

BLOOD in the stool is a common manifestation of many diseases of the alimentary tract, but lesions responsible for it are located in or below (see Chapter XXXVI, Vol. II) the stomach very much more frequently than higher up.

Occult and macroscopic blood in evacuations may result from trauma, wounds, or lesions located in the nose, larynx, pharynx, throat, esophagus, or lungs, where it has been swallowed, and blood that has gained entrance to the stomach in this way may be vomited—*hematemesis*. Consumptives while having a hemorrhage from the lungs—*hemoptysis*—frequently swallow considerable blood, which may be evacuated through the mouth, the anus, or both; but in the majority of instances blood in the movements indicates that the patient is suffering from an affection of the stomach or intestine.

Lesions that cause bleeding are often *located* in the stomach and duodenum, less often in remaining segments of the small intestine, and very frequently in the colon and rectum, the latter being by far the most common site of disease responsible for blood in the stools.

The author treats many patients yearly who seek relief from gastric, intestinal, or rectal hemorrhage, some of whom are but slightly anemic, while others are almost completely exsanguinated from loss of blood, and knows of no class of cases wherein a diagnosis is more difficult to make, except when bleeding is from a lesion low down, which can be reached by the finger or inspected through the proctoscope or sigmoidoscope.

This class of sufferers is difficult to control because they are frightened, nervous, and prone to change physicians unless hemorrhages are promptly arrested.

Patients suffering from hemorrhage in the small intestine and colon are frequently robust and otherwise healthy; women and individuals whose ages range from twenty-five to forty years are more prone to gastric and intestinal hemorrhages than children and other persons—excepting cancer subjects.

Many patients suffer from serious disease of the stomach or intestine who do not complain of hemorrhages, though their stools daily or occasionally contain occult—invisible—blood, and because of this fecal analysis should be practised in every obscure gastro-intestinal case.

The amount of bleeding usually varies with the number and extent of lesions, though large ulcers may induce *slight* when they involve small vessels, and a diminutive ulcer that perforates a large artery or vein may cause *profuse* hemorrhage. Slight or copious bleeding may occur in conjunction with or independent of other gastro-intestinal manifestations.

Finding of blood in the evacuations is of no diagnostic value regarding the gravity of the patient's disease because it may be a symptom of both unimportant and serious lesions of the stomach and intestines.

ETIOLOGY

Intestinal hemorrhages, slight or profuse, may be the result of trauma within or without the bowel, induced by a blow, fall, or kick upon the abdomen, manipulation of an instrument during operation, or passage through the stomach or intestine of large or small foreign bodies, having rough irregular pointed edges, or impacted fecal masses that induce ulcers or larger wounds in the mucosa through pressure necrosis or lacerations and infection.

Disease of the nose, throat, mouth, esophagus, and lungs are occasionally responsible for blood in the stools because in such cases and following wounds in these regions it is swallowed and passes downward through the intestine.

Gastric diseases: ulcers—peptic, ordinary, mercurial, alcoholic, hemorrhagic—erosions of the mucosa, achylia gastrica, carcinoma, stricture, hyperacidity, hypermotility, and ptosis frequently cause slight or dangerous bleeding, and under such circumstances blood may be vomited or evacuated through the anus.

Hepatic disease—cirrhosis, gall-stones, jaundice, portal thrombosis, cancer, and laceration of ducts occasionally cause bleeding, wherein occult or macroscopic blood is discoverable in the stools, and occasionally pancreatic affections, such as cancer and hemorrhagic pancreatitis, are responsible for blood in the evacuations.

Enteric diseases, of which the most common are duodenal ulcer, malignancy, catarrhal, and specific enteritis, frequently induce slight or profuse hemorrhages.

Chronic intestinal obstruction caused by cancer, stricture, adhesions, kinks, membranous pericolitis, invagination, divertic-

ulitis, ptosis, etc., is accompanied by more or less bleeding when the mucosa is ulcerated.

Constipation is an occasional factor in intestinal hemorrhage where feces collect and form large hard masses or scybalæ, which through pressure induce stercoral ulcers, or lacerate the mucous membrane during their downward passage or evacuation.

Ulcerative colitis—catarrhal, syphilitic, tubercular, gonorrheal, helminthic, balantidic, entamebic, bacillary, etc.—is the most common cause of gastro-intestinal bleeding, and in such cases hemorrhages may be slight or grave.

Miscellaneous Diseases.—Occult—macroscopic—blood has also been encountered occasionally in patients suffering from *scurvy*, *vicarious menstruation*, *tetany*, *arterial sclerosis*, *cardiac disease*, *locomotor ataxia*, *pellagra*, *colonic chromatosis*, *malaria*, *septicemia*, *typhoid fever*, *amyloid degeneration*, *pernicious* and *ordinary anemia*, *Banti's disease*, *leukemia*, *infectious diseases of children*, *circulatory affections*, *mesenteric embolism*, *purpura*, and *colitis hæmorrhagica*.

Intestinal bleeding has also resulted from prolonged sun baths, extensive skin burns, accidental or intentional swallowing of escharotics, continuous use of strong cathartics, manipulation of the abdomen by osteopaths, instrumental examination of the stomach and intestine, careless introduction of stomach and enema tubes, instruments and gauze left in the abdomen that ulcerated into the bowel, collections of worms inducing colitis, irritation, or staining, phosphorus poisoning, aneurysm of the aorta or intestinal vessels, injury from foreign bodies, and postoperative ulcers, etc.

Hemophiliacs suffer from severe gastric and intestinal hemorrhage more frequently than other subjects because they invariably bleed profusely when continuity of the mucous membrane is broken.

Several instances have been recorded where, at autopsy, no lesions were found in the stomach or intestines of subjects whose stools constantly contained occult blood for a short or considerable time preceding death.

SYMPTOMS

When bleeding from stomach or intestine is slight, as evidenced by occult blood in the stools, manifestations and signs of hemorrhage are absent, but the patient may exhibit symptoms of any gastro-intestinal disease from which he suffers.

Usually the first sign of hemorrhage is the finding of occult, bright red—*fresh*—dark pitchy—*melena*—brown or coffee grounds-like blood in evacuations; it may be easily seen in some and not be discoverable in other cases until a fecal analysis has been made for the purpose, or to diagnose some other ailment.

Victims of chronic, slight, or profuse bleeding are anemic to a greater or less degree, and examination of the blood shows a deficiency in hemoglobin and lessened erythrocytes. In such cases anemia comes on gradually, but when bleeding is alarming it occurs quickly. Sometimes in a few hours, where a large amount of blood has been lost as the result of an operation or involvement of a large gastric or intestinal vessel by an ulcer, the patient's skin changes from the normal to a pale waxy color, indicating almost complete exsanguination.

Syncope is an important symptom in many cases of acute hemorrhage, and is often helpful in arresting bleeding because of lowered blood-pressure and contracting vessels while the patient is unconscious.

Subjects having a serious hemorrhage break out in a cold clammy perspiration, are extremely restless and nervous, experience air-hunger, have a very fast thread-like pulse, complain of abdominal distention, and have a constant desire to stool when bleeding takes place in the sigmoid flexure or rectum.

DIAGNOSIS

There is no difficulty in making a diagnosis where evacuations contain fresh blood, or when they are chiefly composed of blackish or brownish clots—coffee-grounds stools—but slight hemorrhages often go unrecognized because, unless feces are microscopically examined or tested for occult blood, bleeding may not be suspected.

Occult and macroscopic blood in movements may not be important when seen once, as bleeding may be the result of a laceration in the mucosa made by a pointed foreign body or passage of a hardened fecal mass, but when occult or visible blood is repeatedly discovered in the stools there is evidently a lesion of some sort in the stomach, intestine, or rectum.

Bright red blood is usually a manifestation of disease in the *rectum* or lower sigmoid flexure, but *dark brownish* collections of blood point to lesions higher up in the *colon*, *small intestine*, or *stomach*.

Persistent occult blood in the excrement suggests an affection of the stomach or small intestine, but is of no value as a diagnostic aid in localizing the lesion in the gastro-intestinal tract responsible for bleeding. More reliable information regarding the location and cause of bleeding is gained from a careful history, studying subjective and objective symptoms, and carefully examining the patient from every angle, than from repeated fecal analyses and tests for occult blood following special meals.

Occasionally meat fiber, broken up colored vegetable cellulose

—watermelon, tomato, and cherry—salts of iron have been mistaken for blood in feces, and errors have been made when examining for occult blood in patients having taken iron or hemoglobin prior to the test.

Many laboratory tests have been devised for occult blood, but they have been omitted, since their description is out of place in a work of this character.

Hematemesis plus blood in the stools points to gastric ulcer in the absence of mouth, throat, esophagus, or lung lesions, though vomiting of blood occasionally complicates duodenal ulcers.

Bleeding from acute peptic ulcers is usually not serious, since small vessels are involved, and is more often alarming when due to chronic ulcers, which are destructive and attack larger vessels.

Gastric and duodenal ulcers bleed frequently, as evidenced by occult or gross blood in the stools or hematemesis; but it is often difficult or impossible except by radiography or laparotomy to differentiate between them, though pain after eating comes earlier in gastric than duodenal lesions, and in the latter suffering is centered in the right hypochondriac region.

Gastric hemorrhages frequently stop spontaneously and rarely terminate fatally; but when bleeding from an ulcer is alarming, operative measures have usually been deferred too long.

Scirrhus cancers seldom bleed, but carcinomata often induce continuous slight bleeding, and melena is a frequent symptom; coffee-ground stools with lactic acid and diminution or absence of hydrochloric point to malignancy. Lesions responsible for hemorrhage are rarely located in the jejunum and ileum, and when they are, it is easy to mistake them for those of the stomach and duodenum except they be the result of catarrhal, syphilitic, or tubercular enteritis, diseases recognized by their other manifestations.

Cancer, catarrhal, and different forms of specific ulcerative colitis are frequently characterized by slight or profuse hemorrhage. Patients suffering from malignant tumors are usually cachectic, lose weight rapidly, complain of constipation, tumor, pain and tenderness at a given point, recurring abdominal distention, and their stools contain pus, blood, mucus, and maybe tumor *débris*.

Ulcerative colitis is easy to diagnose since it is characterized by a gradual loss in weight, chronic diarrhea, abdominal cramps, marked indigestion, foul-smelling stools containing mucus, blood, and undigested food remnants. The finding of ordinary or membranous mucus, Shiga's bacilli, *Entamœbæ histolytica*, tubercle bacilli, *Balantidia coli*, segments of worms or their ova, etc., will

determine the type of colitis with which one has to deal. In colitis largest ulcers are usually located in the lower bowel, and can be easily inspected through the proctosigmoidoscope, and their number and character accurately determined.

In doubtful cases *Wassermann* and *tuberculin* tests are made to determine whether or not the patient has syphilis or tuberculosis.

Rectal bleeding may be caused by a cancer, polyp, any type of ulceration, fissure, hemorrhoids, and other rectal affections, but there is no excuse for a mistaken diagnosis here, since all parts of the rectum can be explored with the finger or inspected through the proctoscope.

TREATMENT

The treatment of gastro-intestinal hemorrhage depends in a measure upon the cause and location of the lesion and complicating disease. Often slight hemorrhages stop spontaneously, but when bleeding is frequent and profuse a determined effort should be made to arrest it and cure the affection responsible for loss of blood.

Alarming bleeding is controlled or prevented by having the patient *rest* quietly in bed for a few days or weeks; abstain *from food*, except *nutrient* enemata, refrain from taking strong cathartics that excite peristalsis and augment or start bleeding; apply an ice-bag or coil to the abdomen, and prescribe morphin, gr. $\frac{1}{4}$ (0.016), or opium, gr. $\frac{1}{2}$ (0.03), to relieve pain and anxiety, quiet peristalsis, and enable the patient to sleep, all of which favor the formation of thrombi to occlude the vessel wounds.

Where the patient has lost or is losing considerable blood, water and fluid nourishment—tea, iced milk, or egg albumen jelly—in limited amount may be administered at regular intervals to relieve thirst, replace fluid in vessels, and sustain the patient.

Under such circumstances one may sometimes prescribe solid food, but filling the stomach and intestine frequently starts up or prolongs bleeding, in which case, if nourishment is prescribed, it should be fluid when taken by mouth until the danger from hemorrhage has passed; then a restricted diet may be substituted for nutrient enemata. Rectal feeding is discontinued when enemata stimulate peristalsis.

Relief is to be had from gastric ice-water lavage when the stomach contains stagnant food or blood-clots, and by saline enemata or Murphy drip of tap-water subsequent to dangerous bleeding. When hemorrhage has been controlled and the patient placed on a full or restricted diet daily soft evacuations are procured by the administration of Epsom or Carlsbad salts in broken doses or with the aid of mild dinner pills.

Formerly stypticin, epinephrin, ergot, and astringents which supposedly caused contraction of the blood-vessels were generally used in the treatment of internal hemorrhage, but are not considered reliable now because they *augment blood-pressure* and *enhance* vasoconstriction, which tend to expel thrombi and renew bleeding; hypodermoclysis and intravenous infusion may do the same by dislodging partly or formed clots.

Some physicians prescribe tannic or gallic acid, lead acetate, iron perchlorid, or turpentine; but these remedies are objectionable because they induce nausea and seldom control bleeding. Bismuth subnitrate, administered in 20-gr. (1.3) doses three or more times daily, is quite reliable because it minimizes peristalsis and sticks to and forms a protective covering over bleeding lesions, but bismuth is discontinued as soon as practicable because of its tendency to form enteroliths that cause obstruction when it is taken in large amounts and for a considerable time. Adrenalin chlorid 1 : 1000, $\text{m}\times$ (0.66), given hypodermically every three or four hours, occasionally helps to arrest hemorrhage, but ensuing increased blood-pressure has been known to dislodge blood-clots.

The author has obtained satisfactory results from calcium chlorid—phosphate and lactate—gr. xv (1.0) every three hours in conjunction with a 10 per cent. solution of gelatin, ℥ viij (500 c.c.), agents which favor coagulation when this is delayed by the absence of or deficiency in blood coagulation elements.

The employment of a liberal quantity of rabbit, horse, or diphtheric serum also aids in counteracting internal hemorrhage.

Heart stimulants—strychnin, digitalis, etc.—are contraindicated during and shortly following hemorrhage, as they may increase blood-pressure, force the coagulum from the vessel, and start bleeding.

Styptase has given very good results in cases of gastro-intestinal hemorrhage, and is a desirable agent because it produces hemostasis without increasing blood-pressure. When vessel walls are weakened through the ravages of syphilis, tuberculosis, or arteriosclerosis bleeding is prone to recur again and again until remedies prescribed for these diseases have improved the patient's health and strengthened blood-vessels.

Surgical Treatment.—Operative procedures indicated in the treatment of gastro-intestinal bleeding vary, since lesions causing it differ as to location and etiology.

Gastric and *duodenal* ulcers are dealt with by exposing and *cauterizing* or *excising* them, and in troublesome cases by reinforcing the procedures with *gastro-enterostomy*.

Some surgeons rely on *gastrojejunostomy* in this class of cases

where palliative measures and rest fail to control bleeding, while others *ligate* blood-vessels supplying the tissues involved by the lesions, and perform gastro-enterostomy.

Hemorrhages from *erosions* of the mucosa—not ulcers—have sometimes been controlled by infolding them and *plicating* the stomach with sutures.

Gastric *cancers* are extirpated if operable, but when irremovable, resulting hemorrhages are controlled by palliative measures outlined with or without *gastro-enterostomy*.

Lesions responsible for bleeding are seldom located in the *small intestine* below the duodenum, and hemorrhage from them can usually be controlled by non-operative measures; but in neglected cases where bleeding is caused by tubercular or syphilitic enteritis, *enterostomy* and irrigation of the bowel daily with an ichthyol solution, 2 per cent., is indicated, together with constitutional treatment.

Lesions responsible for intestinal hemorrhage are located in the *colon* and *rectum* much more frequently than higher up, and it is easier to eliminate the cause and arrest hemorrhage in these regions than the stomach, duodenum, or remaining segments of the small intestine, because they can be simultaneously treated from above and below, following the author's ceco-ileostomy (Figs. 989, 993).

Generally colonic and sigmoidal hemorrhages complicate catarrhal, syphilitic, tubercular, bacillary, or other forms of ulcerative colitis, and can be prevented or controlled by rest in bed, regulating the diet and movements, prescribing the above remedies internally, and irrigating the colon once or twice daily with a solution of ichthyol, balsam of Peru, or potassium permanganate 2 per cent. per anum, which tend to heal the lesions causing bleeding.

In obstinate cases complicated by mixed infection ulceration where these measures fail to cure the colitis, *appendicostomy* (Fig. 1006), *cecostomy* (Fig. 996), or *Gant's ceco-enterostomy* (Fig. 1019) is indicated to insure perfect through-and-through irrigation of the diseased gut with the irrigants named above.

Chronic *intestinal obstruction* is occasionally complicated by slight or serious bleeding that continues until it has been corrected, the blocked segment of gut has been *excluded* (Fig. 1060), *resected* (Fig. 986), or an *artificial anus—colostomy*—(Fig. 1031) established above the point of obstruction.

Excision (enterectomy or colectomy) is the operation of choice for the relief of hemorrhage caused by *cancer* involving any segment

of the small or large intestine, but where the growth is inoperable, palliative measures are indicated until complete obstruction is threatened, when *colostomy* or *exclusion* of the cancer must be resorted to if the patient's life is to be prolonged.

The reader is referred to Chapter XXXVI for a description of the causes, symptoms, diagnosis, and treatment of anorectal hemorrhage.

Prognosis.—Frequently gastro-intestinal hemorrhage is unimportant, and does no harm beyond making the patient nervous; occasionally, owing to acute or chronic insidious bleeding, the sufferer becomes markedly anemic and his heart may be greatly disturbed; in rare instances patients die as the result of a very profuse single hemorrhage or cumulative effect of chronic bleeding.

The prognosis in this class of cases depends on the character of the disease causing hemorrhage and manner in which it is treated, the mortality being higher in cases of gastric and duodenal ulcer, cancer of the stomach or intestine, and ulcerative colitis than in other affections named as etiologic factors in intestinal hemorrhage.

HEMOPHILIA

This condition must be comparatively rare, since the author has encountered few typical cases, which include those met in his private hospital and clinic practice.

Hemophiliacs are usually males and inherit their tendency to bleed upon the slightest provocation, but isolated cases have been observed whose relatives were not similarly afflicted. True hemophiliacs bleed profusely and sometimes die from insignificant or larger wounds, and one is justified in refusing to operate on such subjects unless the condition from which they suffer endangers their lives. The author lost a man following a ligature operation for hemorrhoids, but assumed no blame since the patient had previously become almost exsanguinated from the bleeding of ulcerated hemorrhoids that could not in any other way be arrested; in this case the usual mucocutaneous incision was omitted to minimize danger from hemorrhage, but the patient died on the sixth day from secondary bleeding due to sloughing of the tumors; every known device was used to control hemorrhage in this instance, but bleeding continued.

In the author's other cases after the loss of considerable blood hemostasis was secured by one or other of the plans recommended in Chapter XXXVI devoted to Anorectal Hemorrhage.

The *pathology* of hemophilia is not fully understood, but the bleeding is difficult to control mainly because the quality of the

blood is such that it refuses to coagulate and form occluding thrombi, and vessels show little or no tendency to contract.

PURPURA HÆMORRHAGICA

Spontaneous hemorrhage in the skin and gastro-intestinal mucosa is usually acquired, transitory, and may appear independently or as a symptom of some other disease—nervous affections, typhoid fever, scurvy, and infectious diseases; hemorrhagic spots occasionally make their appearance upon hemophiliacs. The author has several times observed purpura hæmorrhagica in bacillary, entamebic, and other types of ulcerative colitis complicated by mixed infection, and once upon the back and abdomen of a man suffering from colonic cancer. This condition is occasionally associated with urticaria, erythema, and angioneurotic edema.

The **etiology** of purpura hæmorrhagica is not fully understood. Some authorities claim primary changes occur in vessel walls, and others, in the blood, but autopsies have demonstrated hemorrhagic areas in the mucous membrane of the intestine and elsewhere, but have not determined their causation.

In purpura spots are dark purple in color, may be single or multiple, flat or slightly raised, small or large, appear simultaneously or gradually, and may disappear quickly or fade away slowly. Occasionally purpuric areas undergo necrosis and slough, or several coalesce over the mucous membrane or skin and form large lesions. When external, purpura is most often seen upon the extensor surfaces of the legs.

There is a special type of purpura hæmorrhagica characterized by vomiting, rigid recti, abdominal soreness and distention, colicky pain, leukocytosis, blood in the stools, sometimes diarrhea, purpuric rash upon the abdomen, and hemorrhagic areas in the intestinal mucosa, particularly ileum, near the ileocecal valve. In these cases hemorrhage is troublesome, there is slight congestion or an edematous ring in the mucous membrane of the involved gut, and invagination, gangrene, and perforation are frequent complications.

The **treatment** consists in relieving symptoms—diarrhea, pain, etc.—and injecting 3iiss to iv (10–15 c.c.) of rabbit, human, or horse serum as often as required to relieve and prevent bleeding.

Opium, starvation, gastric lavage, and calcium chlorid, gr. xv (1.0), in repeated doses are the other agents upon which chief reliance should be placed.

Chapter LXXXII

Rectocolonic Neuroses

General Remarks.—Neurogenic disturbances involving the small and large intestine are often encountered in hysteric, neurasthenic, highly strung individuals, and in those afflicted with locomotor ataxia, paresis, organic nerve disturbances, and disease, injury, or tumors of the brain or spinal cord.

Neuroses here do not always present an independent clinical picture, since the neurogenic disturbance may be associated with any of the above diseases, or occur as the result of and in connection with psychic phenomena brought on by sorrow, shock, fright, or other powerful emotions. Diarrhea, constipation, exhaustion, abdominal weakness, and sinking sensations are frequent manifestations of profound mental perturbation.

Intestinal neuroses may occur from childhood to old age, but are most often seen in persons between thirty-five and fifty years of age, and in the well-to-do without occupation, who continually worry over their condition.

Neurogenic intestinal disturbances may be secretory, sensory, or motor, result from an abnormal cerebrospinal or sympathetic nervous system, or both, and the disturbing factor may be central or local. Frequently evidence of organic changes in nerves or their centers is lacking, and stimuli responsible for pain, augmented peristalsis, hypersecretions of mucus, or inhibition of gut function may be due to strong psychic impulses, or the result of toxins having a chemical or bacterial origin.

It is always difficult or impossible to distinguish between neuroses of the small intestine and the colon, but neurogenic disturbances of the rectum are easily differentiated from the above.

There are several types of intestinal and colonic neuroses, of which the following are the most frequent and important: *constipation*, *enterospasm*, *diarrhea*, *enteralgia*, *borborygmi*, *tabetic crises*, *proctalgia*, *rectal hyperesthesia* and *anesthesia*, *fecal incontinence*, *gout*, *rheumatism*, *digestive hysteria*, and *membranous enterocolitis*.

Constipation.—Costiveness is a troublesome manifestation of spinal cord affections accompanied by weakening of reflexes that control defecation, and constipation not infrequently is a symptom of most nervous diseases, particularly those accompanied by paresis of intestinal musculature and diminished peristalsis.

Treatment consists in resorting to corrective measures for the neurogenic disturbance, and administering laxatives, cathartics, and enemata in doses of sufficient quantity and frequency to procure efficient daily evacuations, reinforced by oil or soapsuds injections when indicated.

Enterospasm.—Spastic constipation is occasionally met with in very nervous individuals, and enterospasm may be confined to a single segment or involve the entire colon to such an extent that the bowel is knotted or feels like a fibrous cord on palpation.

Patients thus afflicted suffer greatly from fecal impaction, tympanites, colic, and occasionally mucomembranous evacuations until relaxation of the circular and longitudinal muscle-fibers is brought about.

Treatment.—Enterospasm is usually relieved in a few hours by restricting the diet to fluids, hot-water drinking, application of abdominal fomentations, frequent hot-water or oil enemata, and administration of belladonna, gr. $\frac{1}{8}$ (0.008), three or four times daily, therapeutic agents tending to soothe the bowel and lessen intestinal spasm.

After the acute attack has been abated measures are taken to improve the mental state of the patient, minimize nervous irritability, and heal the gut when inflamed or ulcerated by high oil and bisnuth enemata, colonic ichthyol (2 per cent.), or normal saline irrigations. Rest in bed and forced feeding with food containing an abundance of cellulose bring good results in cases of spastic constipation complicated by colica mucosa.

Diarrhea.—Loose movements are a frequent manifestation of functional and organic neurogenic affections, and sometimes it is difficult to differentiate nervous diarrhea from true intestinal catarrh. This form of diarrhea is most troublesome in the early morning, and without apparent cause the patient has a number of painless watery evacuations in rapid succession. Except when the patient suffers from gastrogenic or enterogenic disease or catarrhal enterocolitis the stools are free from feces and do not contain undigested food remnants, and evacuations are not increased by food constituents.

Nervous diarrhea is most troublesome in hysteric, neurasthenic, and emotional individuals, and evacuations are increased by worry, fright, and nerve strain, however produced. In this class of cases loose movements may result from hypermotility or hypersecretion, when evacuations contain considerable mucus in the form of jelly-like masses, membranous strings, or casts of the bowel.

Usually neurogenic diarrhea does not cause acute suffering,

but when associated with membranous enterocolitis or tabetic intestinal crises the patient complains bitterly of abdominal pain and meteorism.

Neurogenic diarrhea frequently complicates exophthalmic goiter, ptomain poisoning where toxins act directly upon the intestinal nerve mechanism, tabetic crises, and reflex disturbances arising from appendicitis, cholecystitis, and diseases of the female generative organs.

Treatment.—Dieting, rest, and colonic irrigations are of little value since the colonic mucous membrane is devoid of lesions. *Psychotherapy* is the sheet anchor in these cases, and periodic watery evacuations are minimized or arrested by placing the patient in pleasant surroundings, encouraging him to believe his condition is easy to correct, having him avoid business drudgery, social engagements, and anything that causes mental worry. In addition, arsenic, strychnin, physical measures, soothing baths, and other therapeutic measures are prescribed to allay nervous irritability and correct existing disturbances in the nervous system.

Enteralgic and celialgic pains in the colon are occasionally encountered in nervous individuals, those afflicted with organic affections of the nervous system, and sufferers from gout and oxalic acid poisoning. Pain may be combined with anorexia, sensations of fulness, impaired digestion, or diarrhea characterized by watery or mucoid evacuations.

Enteralgia is most often observed in enteroptotic, hysteric, nervous, and excitable persons, and attacks may be momentary or of several hours' duration.

Treatment.—Temporary relief is obtained by aspirin, gr. v to xx (0.3–1.3), administered three times daily, reinforced by nightly doses of sodium bromid, gr. xx (1.3), clearing the bowel of feces and mucus with enemata or magnesium sulphate, ʒss (2.0), in broken doses and hot abdominal fomentations.

Rectal Neuralgia—Proctalgia, Hysteric, Irritable Rectum.—Pains simulating neuralgia are occasionally encountered in the anorectal and coccygeal regions; the former is designated proctalgia and the latter coccygodynia. The term *neuralgia* has been applied to all sorts of obscure pain situated in the lower bowel, but the word would more clearly indicate the condition if restricted to pain caused by pressure on nerve lesions.

Marked suffering results from chronic and tonic contractions of the sphincter and levator ani muscles incited by fissure, ulcers, polyps, hemorrhoids, papillitis, and cryptitis, but in such cases immediate relief is obtained by divulsing or incising the anal canal

or removing the exciting cause. Tabetic rectal crises are frequently mistaken for proctalgia, but this is inexcusable when the patient is properly examined.

Constipation complicated by frequent rectal impaction that overdistsends the rectum and compresses the sacral nerves against the bone is responsible for considerable suffering. Obscure rectal pains are usually complained of by hysteric and neurasthenic individuals who are inclined to exaggerate their suffering. Several times the author has relieved individuals supposedly suffering from proctalgia by removing embedded foreign bodies from the rectum, dilating a stricture, reducing prostatic inflammation, removing a stone from the bladder, excising the coccyx, suspending a prolapsed uterus or ptotic sigmoid, extirpating a tumor, or curing an affection in neighboring or distant organs that pressed upon nerves or induced reflex pain in the anorectal region.

When pain is continuous it may be neuralgic, but if suffering is aggravated by a distended rectum or by defecation, it is usually induced by a rectal lesion. Most persons suffering from obscure rectal pain seek relief because they are convinced that their trouble is malignant.

Epileptics often complain of puzzling nightly pains in the rectum, and proctalgia has been observed where the spine was diseased, injured, or necrosed; but when the patient shows lost knee-jerks, Argyll-Robinson pupils, Rhombert symptom, impaired locomotion, and anesthetic nerve areas tabes dorsalis is responsible for the pain.

Treatment.—A great deal is accomplished by psychotherapy where the sufferer is hysteric or neurasthenic. Suffering incident to contraction of the levator ani muscle and sphincteralgia is mitigated by hot oil injections and correction of lesions responsible for muscular irritation, or by divulsing the sphincter or splitting the anal canal.

Tonics and forced feeding are indicated when the patient is undernourished or suffers from enterospasm, and laxatives are indicated to prevent recurrent fecal impaction when constipation and auto-intoxication are troublesome. Electricity, massage, vibration, and hydrotherapy are valuable adjuncts to the treatment because of their psychic and soothing action upon the sufferer, and sedatives like hyoseyanus and bromids are serviceable when the patient is extremely nervous and cannot secure greatly needed rest and sleep.

The reader is referred elsewhere for a full discussion of *sphincteralgia* and *coccygodynia*.

Rectal Hyperesthesia.—Hyperesthetic or acutely *sensitive spots* in the rectum may be single or multiple, vary from $\frac{1}{2}$ to 1 inch (12.70 mm.—2.54 cm.) in size, and situated in the anal canal or ampulla. The mucous membrane of the sensitive areas is smooth, devoid of lesions, and normal in appearance or slightly congested. Rectal hyperesthesia is encountered in neurotic individuals, more frequently in women than men, and among the wealthy and unoccupied. The condition may complicate central or local lesions affecting the nerves or constipation.

The chief symptoms are pain upon palpation or distention, tenesmus, and a desire to defecate at inopportune times, as, for instance, while the patient is acting, preaching, or attending public functions, irrespective of whether or not an action has been previously procured. Pain is limited to definite areas, is most intense prior to stool, and sharp or darting in contradistinction to neuralgic pain, which is paroxysmal and agonizing.

Treatment.—Patients of this class are kept comfortable by restricting the diet, prescribing oil enemas to soften and evacuate the feces, administering sedatives to quiet the nerves, and applying soothing lotions, ointments, or suppositories to sensitive spots. Divulsion of the sphincter occasionally brings relief, but cauterizing agents aggravate the patient's condition.

Rectal Anesthesia.—Occasionally the rectum is insensitive and the patient is unaware of an approaching stool. Anesthesia may be partial or complete, temporary or permanent, and be caused by reflex disturbances, an operation, or disease of the nerves or their centers.

Routine **treatment** is impracticable in these cases and therapeutic agents must be selected in accordance with the cause of the trouble.

Fecal Incontinence.—This condition often complicates brain lesions and disease or injury involving the lumbar cord presiding over the anorectal musculature. In such cases the anus remains patulous.

Treatment consists in removing or curing the tumor or disease involving the nerve center responsible for the condition. When this is impossible the anus is narrowed after the plan elsewhere described.

Borborygmi.—Rumbling noises within the abdomen, due to hyperistalsis or swallowing air, is an annoying complication of certain neurogenic disturbances in emotional individuals, and meteorism is frequently associated with borborygmi.

Treatment.—Usually the author has been able to arrest these

noises by having the patient take a hot bath, high hot colonic irrigation, and a small dose of belladonna, gr. $\frac{1}{8}$ (0.008), all of which quiet the bowel and facilitate the evacuation of flatus.

Rectocolonic Tabetic—Ataxic—Crises.—Intestinal and rectal crises are a frequent complication of *locomotor ataxia*, and often the disease is diagnosed early when resulting manifestations are analyzed and the anorectal musculature is inspected and digitally examined.

The etiology of intestinal crises is not understood, but it is known that nerves of both the cerebrospinal and sympathetic nervous systems may participate singly or together in the disturbance. Possibly the trouble results from a chemical or bacterial toxin that stimulates the already irritable sensory, motor, and secretory nerves to excessive activity, thereby causing the patient to suffer from colicky pains and of augmented peristalsis, with resulting diarrhea or hypersecretion of mucus.

Occasionally intestinal crises are complicated by spastic constipation, but generally they are characterized by cramps, a retracted or knotted abdomen, and cholera-form stools or mucomembranous evacuations; the attacks are periodic and may be days or weeks apart, and last from a few moments to several hours.

Treatment.—In addition to using the usual therapeutic measures employed for *tabes dorsalis* remedies—morphin, gr. $\frac{1}{8}$ (0.008); bismuth, gr. x (0.6), or gallic acid, gr. v (0.3), should be prescribed as required to alleviate pain, minimize peristalsis, and lessen mucous secretion. Rest in bed, restricted diet, and hot oil enemata are valuable adjuncts to the above remedies.

Ataxic—Tabetic—Rectum.—Rectal crises characterized by burning sensations in the rectum, almost constant desire to defecate unrelieved by an evacuation, fecal incontinence, hypersecretion of mucus and relaxation of the mucosa, rectal musculature, and perianal strictures are often complained of by individuals suffering from *tabes dorsalis*.

In several instances the author has diagnosed unsuspected locomotor ataxia by flabby muscles of the anorectal region and incontinence of urine and feces.

Occasionally the sphincter and levator ani muscles induce unbearable suffering through contractions lasting from a few moments to several hours. Stimuli or impulses may be transmitted through nerves derived from the cerebrospinal and sympathetic systems to cause *sensory* (pain), motor (muscular spasm), or secretory (hypersecretion of mucus) disturbances that may be confined to the rectum or involve the colon.

Symptoms.—Persons having an ataxic rectum complain of

one or more of the following symptoms: burning in the rectum, sphincteric irritability, lack of warning of an approaching stool, partial or complete urinary or fecal incontinence, hyperesthesia or anesthesia of the perianal skin, and occasionally periodic tearing pain or sensation of weight in the rectum when the bowel is full or empty.

The **diagnosis** of rectal tabetic crises is based on other indications of *tabes dorsalis*, the above manifestations, absence of lesions in the mucosa, ease with which the bowel is inflated through the proctoscope, non-resistance of anorectal musculature to insertion of the finger, the open anus following withdrawal of the finger or cylindric speculum, and hypertrophy of the perianal skin.

Treatment.—Pain is best relieved by hot oil and bismuth, starch-water, and laudanum, or cocain injections, but when suffering is due to muscular spasm hypodermics of morphin, gr. $\frac{1}{4}$ (0.016), with atropin, gr. $\frac{1}{150}$ (0.000432), or a suppository containing gr. $\frac{1}{4}$ (0.016) each of the extracts of opium and belladonna are indicated.

Divulsion or incision of the levator and sphincter ani muscles bring relief in early stages of the disease, but later mitigate but do not completely arrest muscular irritability. Hence these procedures are of doubtful value since they sometimes lessen the patient's control over the feces.

Permanent results are not to be expected except through improving the tabetic condition of the patient, because local manifestations are dependent upon degeneration in the posterior columns of the cord.

In one instance where a tabetic subject suffered from colitis—diarrhea—and complete fecal incontinence the author performed *colostomy* to lessen annoyance caused by frequent involuntary movements.

Membranous Enterocolitis (Myxorrhœa Coli).—Membranous colitis is classed among intestinal neuroses by internists, but the condition may result from a disturbed nervous system, obstruction, or other lesions located in the colon.

The condition is characterized by the periodic evacuation of mucus in the form of shreds, jelly-like masses, whitish balls, or casts of the bowel, which are preceded by abdominal weakness, pain, or colic caused by spasmodic contraction of the bowel in its effort to expel the offending mucoid discharge.

Treatment.—Membranous colitis is difficult to control, but can usually be relieved or cured by a prolonged rest in bed, liberal diet, comprised chiefly of foods rich in cellulose, keeping the bowel open with laxatives, colonic lavage, and prescribing an opiate in

conjunction with belladonna to allay acute pain and cause relaxation of the irritable intestinal musculature. In aggravated cases *appendicostomy* or *cecostomy* and through-and-through colonic medicated irrigations are often curative.

Gout and Rheumatism.—These conditions are sometimes responsible for pain in the lower bowel and spasmodic contraction or inflammation of the anorectal muscles, symptoms not relieved by operation.

Treatment.—Temporary relief is obtained by sphincteric divulsion, hot oil injections, application of heat to the buttocks, keeping the bowel open, and employing suppositories containing morphin or cocain, gr. $\frac{1}{8}$ (0.008), and belladonna, gr. $\frac{1}{4}$ (0.016). Future attacks are prevented by the administration of aspirin, salicylates, and alkaline diuretics in liberal doses and for as long as required.

Digestive Hysteria.—In closing the discussion of intestinal neuroses the author wishes to briefly call attention to hysteria of the digestive organs, a psychic condition brought on by the patient centering his ideas on what he believes to be a gastro-intestinal affection. Eventually through mental influence digestive disturbances arise, such as hysteric nausea, gastro-enteralgia, and constipation or diarrhea.

Treatment.—Psychotherapy is the chief reliance in this class of cases, and physical measures or other therapeutic agents that interest and distract the patient's attention from their supposed gastro-intestinal trouble are indicated.

Chapter LXXXIII

Appendicitis

THE vermiform appendix—very rarely absent—which varies in thickness and in length from 3 to 6 inches (7.62–15.24 cm.) (Fig. 781) or more is frequently the seat of catarrhal and infectious diseases. This worm-like appendage may assume any position, be kinked or straight, free or immobile, and hang loose in the abdomen, or be partially or completely hidden behind the peritoneum. The narrow opening at the appendicocolic juncture and considerable amount of lymphoid tissue entering into its make-up render it liable to disease; the former from obstruction when the aperture closes,



Fig. 780.—Long chronic appendix (A) containing concretions. (Radiographed at Broad Street Hospital.)

and the latter from the lodgment of septic organisms in crevices of lymphoid tissue, which in this respect somewhat resembles the tonsils.

Physiologically the appendix has no known function, but therapeutically it is a valuable adjunct in the treatment of *chronic diarrhea* with hemorrhage and exhaustion, since following *appendicostomy* and through-and-through irrigations one is enabled to speedily cure acute and chronic *ulcerative colitis* responsible for these manifestations.

ETIOLOGY

Etiologic factors in appendicitis are *predisposing* and *exciting*.

Congenital and acquired anomalies—elongation, narrowing, kinking, occlusion, or other defect in the appendix, its mesentery, or blood-supply, predispose infection and inflammation.

Appendicitis nearly always is of bacterial origin, but is said to have been caused by a cold, exposure, external violence, foreign bodies, feces, and parasites lodged within the appendical lumen, stricture of the organ, partial or complete occlusion of its cecal outlet, which lead to distention, stasis, inflammation or infection, and disease in neighboring organs.

Catarrhal, syphilitic, tubercular, amebic, bacillary, balantidic, flagellate, helminthic and ciliate colitis, typhoid fever, cholera, actinomycosis, and other inflammatory infectious and parasitic diseases of the gastro-intestinal tract are frequently important factors in appendicitis usually through direct extension of the inflammatory process from the small intestine or colon.

Any lesion or condition that occludes the appendix, inflames or ulcerates the mucosa opens the way for infection, because this organ contains numerous organisms that under abnormal conditions become pathogenic, causing specific or mixed infection.

PATHOLOGY

Changes in the appendix vary with causation of the inflammation, the resistance, and degree of infection; hence we may have *catarrhal* when mucosa only is inflamed, *interstitial* when the outer appendical tunics are involved, *empyemic* when the organ contains pus, *ulcerative* when the mucous membrane is eroded, *perforative* when a gangrenous area penetrates or distention ruptures the appendix, *obliterating* when lumen of the appendix is obliterated more or less completely by interstitial fibrosis in its walls, *gangrenous* (Fig. 781) when sloughing ensues the result of infection or obstructed vessels, *fulminating* when the infective process develops rapidly, causing necrosis of the organ, or *relapsing* in cases of subacute and chronic appendicitis when the inflammation recurs at short or longer intervals.

For a full description of the varying types of appendicitis the reader is referred to comprehensive works on general surgery.

SYMPTOMS

Briefly stated, the cardinal manifestations of *acute* appendicitis are marked pain, tenderness, and muscular rigidity in the appen-

dical region—McBurney's point—manifestations that usually continue until the appendix evacuates its contents into the cecum, ruptures, sloughs, or in exceptional cases when symptoms gradually abate as the inflammatory process subsides.

Symptoms also vary, depending on virulence of the infection, gangrenous involvement, and whether or not perforation and peritonitis ensue. In aggravated cases pain may be reflected, vomiting intermittent, constipation troublesome, the patient may or may not suffer from chills, rise in temperature, and increased pulse-rate; but if sloughing of the appendix or rupture occurs the usual manifestations of *peritonitis* are evident.

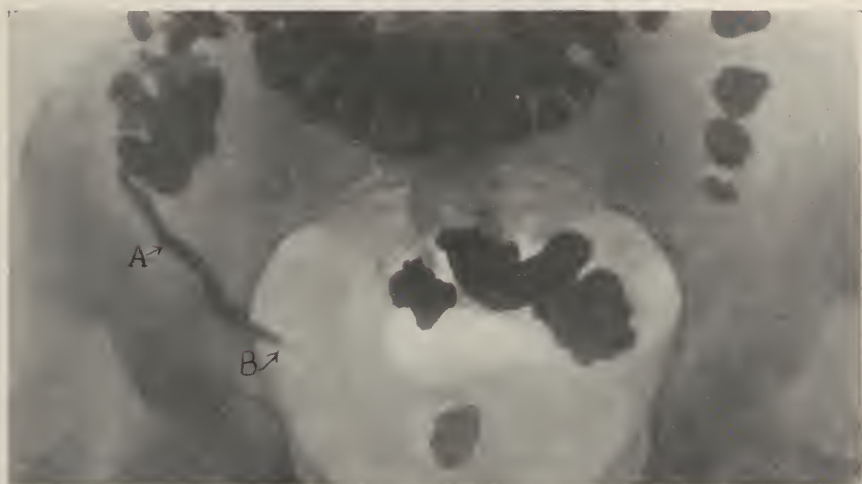


Fig. 781.—Long chronic appendix A, sloughing off at B. (Radiographed at Broad Street Hospital.)

In *chronic* appendicitis the patient complains of reflex digestive disturbances, localized tenderness on pressure, uneasiness in the right lower abdomen, constipation and diarrhea, where pus is daily discharged into the colon to erode the mucosa.

DIAGNOSIS

In typical cases appendicitis is usually easy to recognize, but frequently the disease goes unrecognized and is mistaken for inflammatory disease in the colon, fecal impaction of the cecum, intra-abdominal lesions—gall-bladder, tubo-ovarian or uterine disease, intestinal perforation or obstruction, mesenteric necrosis, stone in the ureter, hernia, and diverticulitis.

In cases where cardinal symptoms are present and radiographic



Fig. 782.—Cecal stasis, adherent appendix, and ptosis of transverse colon.

shadows (Figs. 780, 783) show an enlarged, obliterated, strictured, or extremely long appendix, one is justified in making a diagnosis of



Fig. 783.—Chronic appendix *A*, and ileocecal valve incompetence *B*. (Radiographed at Broad Street Hospital.)

appendicitis, particularly when tenderness is elicited at McBurney's point.

TREATMENT

The treatment of appendicitis is *medical* and *surgical*, but usually the disease is surgical and appendectomy is performed unless the patient refuses surgical intervention, or there is some

complicating heart, lung, or other affection that contraindicates operation.

Medicinal or palliative measures employed in the treatment of acute appendicitis consist in rest in bed, abstinence from food, water and purgatives, ice-bag, hot abdominal fomentations, Fowler's position, Murphy drip, cleansing enemas, and morphin to minimize pain and stop peristalsis (Mask's symptoms), and belladonna to lessen muscular spasm.

Chronic appendicitis is treated symptomatically until the diagnosis is made and the vermiform appendix removed, or manifestations temporarily subside.

Surgical Treatment.—Appendicitis is essentially a surgical disease, it having been conclusively shown that the mortality of this condition is considerably higher under medical treatment than following prompt appendectomy.

Immediate operation is imperative in all *acute* cases unless a competent surgeon is unattainable, the patient declines surgical intervention, or suffers from acute pulmonary tuberculosis, pneumonia, Bright's disease, extreme exhaustion, anemia, or other complicating disease that would make unsafe the administration of ether or the slight shock incident to operation, when nitrous oxid, oxygen, or local anesthesia should be considered.

Some surgeons defer appendectomy in acute cases where manifestations are abating, a questionable practice, since the appendix must be removed some time, and recurrence of the attack may kill the patient before the surgeon can be obtained and the case operated upon.

Occasionally in chronic appendicitis when symptoms are in a quiescent state one is justified in deferring appendectomy until the patient's general health has been improved, complicating disease cured, or until the patient has arranged his financial and business affairs, *but no longer*, as the *interval* operation is less dangerous than appendectomy performed during exacerbation of symptoms, and may leave the patient with a better abdominal wall.

Appendectomy.—The technic must be varied to meet indications in different cases, for in one instance the appendix is simply *inflamed* or *infected*, in another it has *ruptured* or *sloughed off*, resulting in the formation of an *abscess*, and in still another, where feces, a foreign body, or septic organisms have escaped into the abdomen through perforation, the patient suffers from *localized* spreading or *generalized* peritonitis, and lastly, in chronic cases associated lesions must be taken care of.

With this knowledge it is easy to understand why *length of*

the incision, method of handling meso-appendix, and plan of dealing with the appendical stump must be slightly or considerably modified in a series of appendectomies.

The author will not attempt to fully discuss steps in the technic suggested by different operators for approaching the appendix, dealing with the mesentery and manner of handling the appendical stump, some of which are good and others unreliable.

McBurney's operation deserves special consideration, since it was the first practical appendectomy described, is effective, and

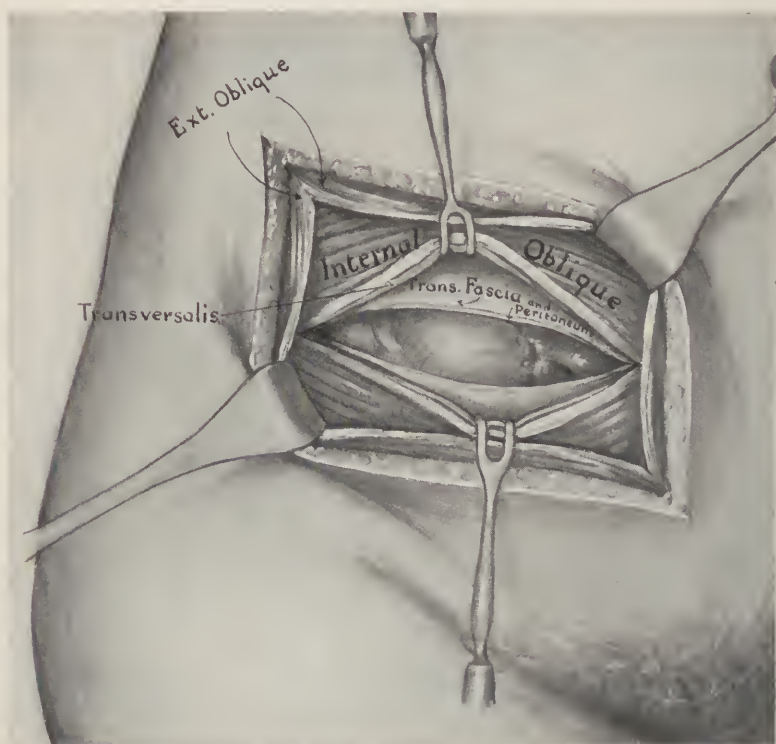


Fig. 784.—Appendectomy: Gridiron intermuscular appendical approach.

seldom followed by hernia, because division of the muscle-fibers and controlling nerves is avoided (Fig. 784).

This procedure, useful in interval cases, chronic recurrent, simple inflammatory, and infective, is not suitable in cases of appendicitis with rupture or sloughing of the appendix, or complicated by abscess or peritonitis because the cut is small, lips of the incision are difficult to keep apart, and it is sometimes impossible to arrange for proper drainage.

In this *intermuscular* (Fig. 784) operation the appendix is approached through a 3-inch (7.62 cm.) incision paralleling fibers of the external oblique muscle which starts 1 inch (2.54 cm.) above a line connecting the anterior superior spine of the ileum and the umbilicus, which it crosses $1\frac{1}{2}$ inches (3.81 cm.) internal to the anterior superior iliac spine. Following incision of skin and fat, fibers of the external oblique are separated, internal oblique and

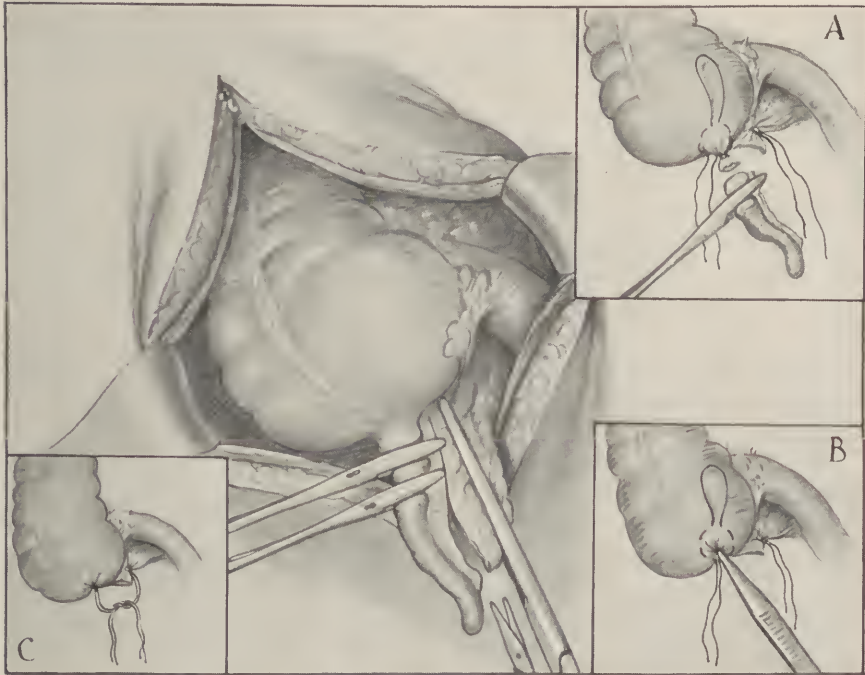


Fig. 785.—Appendectomy: Main picture: Clamp on meso-appendix which is cut up to cecum, freeing appendix, which is doubly clamped; the proximal appendix clamp for crushing, in which groove after clamp removal, appendix is ligated with No. 2 chromic catgut; the distal clamp is to prevent leakage on division of appendix and is left on. *A*, Meso-appendix tied by No. 2 plain catgut; *Pagenstecher* purse-string around appendix base, appendix divided and stump touched with pure *carbolic*; or appendix divided by actual cautery. *B*, Appendix stump being inverted and purse-string being tightened. *C*, Ends of purse-string suture and meso-appendix ligature tied together, leaving no raw surfaces and diminishing chance of adhesions.

transversalis muscle-fibers are in turn separated in their lines of cleavage by blunt dissection made with scissors or handle of a scalpel, muscle layers being retracted as separated (Fig. 784). The exposed transversalis fascia is then incised, bringing into view the subserous areolar tissue, following which peritoneum is caught with mouse-tooth forceps, lifted up, and opened with knife or scissors.

Several other methods of approaching the appendix giving

wider exposure have been proposed, of which the *right rectus incision* (Fig. 785) is the most rational. In this procedure a cut is made down to and through the outer aspect of the anterior layer of the right rectus sheath, where the muscle is either split or displaced inward, following which the posterior layer of the rectus sheath and peritoneum are in turn grasped with forceps, lifted upward and incised throughout the length of the 3-inch (7.62 cm.) rectus incision, taking care to avoid the rectus nerve supply.

This method of opening the abdomen is desirable because the incision is roomy, easily enlarged, and lips of the wound are not prone to fall together as in McBurney's operation.

When the appendix cannot be felt and hooked up with the finger usually it is located by tracing the colonic longitudinal bands to their termination, or seizing the cecum with sponge forceps or thumb and finger and pulling it in one direction and then another, until the appendix comes into view. In some cases cecum and appendix are concealed or bound down by exudates or adhesive bands that must be broken up with a gauze wipe, or divided with knife or scissors before the appendix can be liberated.

After the appendical extremity of the cecum has been brought outside and wound protected with gauze pads the *meso-appendix* is transfixed near its base, ligated with catgut, and divided.

Following introduction of a linen purse-string suture about its base the appendix is clamped with two forceps, the distal to prevent leakage and soiling the operation field, and the proximal, which crushes the organ. After removal of the crushing forceps the appendix is ligated in the groove, severed with a cautery, or divided with knife or scissors and treated with carbolic acid and alcohol, the stump is then inverted with delicate thumb forceps and buried by tying the encircling suture over it; additional infolding peritoneal sutures are added when required.

The abdomen is closed by the layer method, using plain and chromic catgut and figure-of-8 silkworm-gut retention sutures.

Where an abscess has already formed the Kammerer incision is made, the free intestines protected by gauze pads so as to keep pus from infecting the rest of the peritoneal cavity; careful separation of adhesions will slowly liberate pus and allow of appendix exposure and removal.

Sometimes the safest plan is to drain the abscess, permit the wound to heal by granulation, and perform appendectomy later, unless the inflamed gangrenous or detached appendix falls into view easily and can be extracted or removed without danger of spreading the infection.

When the abscess is large or there are multiple pus pockets and satisfactory drainage cannot be provided through the original incision, gauze or other drains are brought out through abdominal stab-wounds or through the vaginal fornix.

The treatment of appendical is the same as for diffuse peritonitis arising from infections in other organs, a description of which is amply given in works on general surgery. This serious condition is usually avoided by opening the abscess without soiling the peritoneal cavity.

In operating on so-called chronic appendicitis, where the patient complains of pain and has some localized tenderness, but no clear history of acute attacks, it is imperative that all associated lesions be carefully sought for; these are: Lane's kink, Meckel's diverticulum, Jackson's membrane, cecum mobile, right-sided pelvic lesions in women, small stone in right kidney, pelvis, gall-bladder, pyloric and duodenal disease. Occasionally in *retrocecal cases* the appendix base must first be ligated and the appendix mesentery clamped and cut from base to tip.

Chapter LXXXIV

Pericolitis and Perisigmoiditis

Definition.—Pericolitis (Fig. 786) and perisigmoiditis (Fig. 787) may be defined as an inflammation of the peritoneal covering of the colon and sigmoid flexure.

ETIOLOGY AND PATHOLOGY

Pericolonic inflammation is seldom discussed in medical societies or books, though quite common and often mistakenly treated for appendicitis. The inflammation may be confined to the bowel, but



Fig. 786.—Perisigmoiditis and pericolitis with massive adhesions complicated by syphilitic ulceration and (A) stricture. Note high and low ulcerated areas and fecal concretions resting above stenosis.

when persistent and extensive or caused by infection, pericolitis may involve and seriously impair adjacent intestinal loops or neighboring organs through the formation of adhesions that angulate (Fig. 787), twist, or otherwise distort and impair their function.

When this condition is secondary to disease or degenerating new growths in the large intestine all tunics may be involved and the bowel wall may be considerably thickened by hypertrophy and by exudative deposits, thinned by atrophy, hardened by fibrosis

in the musculature, or partially destroyed by ulceration. In such cases or when the colon is seriously involved by extension of inflammatory, suppurative, or malignant disease from other organs, bowel function is greatly impaired through immobilization, inhibited or augmented peristalsis, hyper- or hyposecretion of mucus, involvement of nerve mechanism, or occlusion of the bowel from within or without.

Constipation with stasis and auto-intoxication, the result of colonic distortion—usually from adhesions—is the chief symptom in *mild* and *moderate*, but in *aggravated* cases with almost complete occlusion diarrhea is the dominant manifestation.

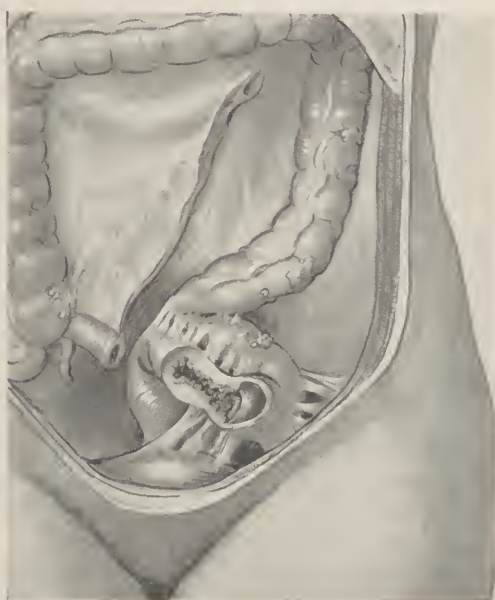


Fig. 787.—Perisigmoiditis with acute double angulation of sigmoid flexure caused by extensive carcinoma.

Regarding the **etiology** it may be said that any irritative, inflammatory, infectious, or malignant process involving the colonic peritoneum is a cause of pericolitis and perisigmoiditis, irrespective of whether the disease originates in or outside the intestine. Named in the order of their importance the chief etiologic factors in this condition are gourmandizing, predominating meat diet leading to putrefaction, continued purgation, ptomain poisoning, catarrhal and ulcerative colitis, atonic constipation or obstipation—from chronic obstructive lesions—complicated by fecal impaction, enteroptosis, and extension of disease from neighboring organs.

The **pathology** is not very well understood because the condition has not received deserved attention by clinicians in hospitals or pathologists in autopsy rooms, who, not suspecting, have frequently mistaken this for some other affection.

Pericolitis (Fig. 787) may involve any colonic segment, but occurs far more often in vicinity of the cecum and lower ascending colon, owing to the frequency of appendicitis, pelvic inflammation, Lane's kink, and tuberculosis in this region; also at the sigmoid flexure, the usual site of fecal impaction, lodgment of foreign bodies, highly inflamed areas, extensive ulceration, stricture, diverticulitis, and malignant disease.

Degree of the inflammatory process is expressed in the form of exudative deposits, filiform, bandular, fan-shaped, thick, tough sheath-like adhesions, or a cob-web-like covering—pseudoperitoneal—containing vessels and fibrous striations, known as Jackson's membrane, which though enveloping may be firmly attached to or glide over the bowel (Fig. 875).

When pericolitis is secondary to catarrhal and specific colitis, stricture, polyposis (Fig. 944), or malignancy, the lumen of the bowel exhibits the usual changes common to these affections described elsewhere; but when caused by pelvic or abdominal suppuration, enteroptosis, congenital defects, and other lesions inducing obstipation the colon is displaced, angulated, twisted, compressed, or otherwise distorted in a manner that impairs its function and aggravates pericolitis.

Since the inflammatory process may be *slight* and limited to the intestine, or be *persistent* and *extensively* involve adjacent structures, the condition may, according to degree, be designated as pericolitis *simplex* and pericolitis *gravis*.

SYMPTOMS

Manifestations of pericolitis and perisigmoiditis vary, depending upon virulence and duration of the inflammation and length of gut involved, together with nature of the disease or condition causing it.

The chief manifestations of fully established chronic pericolitis and sigmoiditis are constipation, recurring fecal impaction, and auto-intoxication occasionally alternating with diarrhea, localized abdominal tension, soreness, pain on pressure, induration or tumor formation, feeling of fecal or gas retention at a definite point, colic during exacerbations or attacks of myxorrhœa coli, and slight or considerable mucus or blood in evacuations. When the result of catarrhal or specific colitis diarrhea is the dominating symptom;

but when the bowel lumen is diminished from within or without, insignificant or grave manifestations of intestinal obstruction are present.

When the condition is complicated by virulent infectious colitis, abdominal, pelvic, or ischiorectal abscess, or an infected diverticulum, the patient runs an irregular or high temperature and exhibits the usual manifestations of septic foci.

DIAGNOSIS

In suspected cases of pericolitis and perisigmoiditis it is important to ascertain if the patient has previously or is now suffering from any gastro-intestinal or abdominal disease that would induce inflammation of the mucosa, musculature, or colonic peritoneum. Having obtained such a history and that the patient complains of the above-mentioned characteristic manifestations, the diagnosis is completed by percussing and palpating the abdomen for sensitive areas, gas retention, thickened or immobilized bowel, and impacted feces; inspecting the rectum with sigmoidoscope for inflamed or ulcerated areas, and macroscopically and microscopically examining feces and discharges for Shiga bacilli, ameba, and segments of worms or their ova.

In obscure cases pericolitis must be differentiated from appendicitis, diverticulitis, chronic peritonitis, gall-stones, and constipation alone or alternating with diarrhea caused by chronic obstructive colonic lesions induced by stasis. Radiographs taken following a barium enema and fluoroscopy materially assist in clearing up the diagnosis in some cases.

TREATMENT

The prophylactic treatment of pericolitis and perisigmoiditis consists in procuring daily soft evacuations by prescribing mineral oil or a laxative; restricting diet to foods that do not leave a large coarse residue, favor fermentation and putrefaction, or irritate inflamed or ulcerated areas.

During periodic attacks much comfort is temporarily derived from continuous hot fomentations, warm oil or saline injections, and combination of belladonna and morphin to relieve enterospasm and pain, reinforced by friction, massage, or mild vibratory treatments to dislodge scybalæ.

Curative treatment consists in eliminating original and continuing causes of intestinal peritonitic inflammation. Catarrhal and specific forms of colitis accompanied by marked congestion and ulceration of the rectocolonic mucosa may be quickly relieved or

cured by daily ichthyol, balsam of Peru solution, 2 per cent., or normal saline irrigation introduced *per anum*, or in obstinate cases from above via an *appendicostomy* or *cecostomy* opening.

Surgical intervention is usually necessary to provide for *through-and-through colonic irrigation* and permit the *straightening of angles and twists*, anchoring the bowel to the abdominal parietes to correct ptosis—*colopexy-sigmoidopexy*—*overcoming ileocecal valve incompetence, breaking up adhesions, draining abscesses, resecting, and short-circuiting* the bowel or establishing an *artificial anus* for the relief of inoperable chronic intestinal obstruction, or dealing with *ovarian, tubal, uterine, vesical, or prostatic disease* involving the gut. When the abdomen is opened means are taken to prevent the formation of postoperative adhesions which would continue the trouble.

In perisigmoiditis convalescence is hastened by sprays, oil and bismuth enemas, topical applications to inflamed areas and ulcers, or manipulation of a bougie or sigmoidoscope when the lower gut is narrowed, angulated, or bound down by adhesions.

Mesocolitis and *mesosigmoiditis* are usually blended with pericolicitis, and because of the impossibility of differentiating them a separate discussion of the condition is unnecessary.

Chapter LXXXV

Diverticula, Diverticulitis—Diverticulosis, and Peridiverticulitis of the Small Intestine, Cecum, Colon, and Sigmoid Flexure

Definition.—A diverticulum is a non-neoplastic out-pouching of intestine having a lumen that does or did connect with the bowel.

Diverticulitis (Fig. 788) is inflammation of a diverticulum, and *peridiverticulitis* is an inflammation of structures surrounding the sac.



Fig. 788.—Multiple diverticula of the colon and sigmoid flexure. Gut sectioned to show opening into sacs (Army Med. Museum).

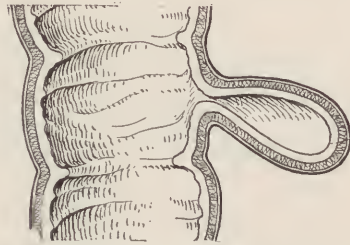


Fig. 789.—True diverticulum in which the sac retains all bowel tunics.

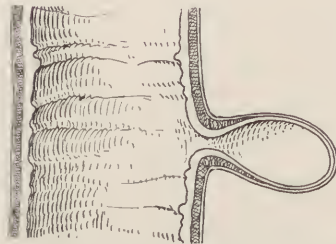


Fig. 790.—False diverticulum in which the sac is composed only of peritoneal and mucous tunics.

General Remarks.—Diverticula may be *congenital* (Figs. 794, 805)—Meckel's appendix—or *acquired*. The former being designated *true* (Fig. 789), and the latter as *false* (Fig. 790). In *true*

diverticula gut tunics constitute the wall, while in *false*, one or more bowel coats give way, permitting the mucosa to herniate outward, forming a pouch that may or may not possess a peritoneal covering. Occasionally true, as the result of prolonged distention, become false, in which case weakened or thinned intestinal musculature shows at the base.

Acquired diverticulitis occurs more frequently between the fortieth and sixtieth years, about twice as often in men as women, and in various intestinal segments from stomach to the anus.

Diverticula, rare in the *appendix* (Fig. 791), *duodenum*, and *jejunum*, occasional in the *ileum*, common in the *cecum*, and very frequent in the *descending colon* and *sigmoid flexure*, involve

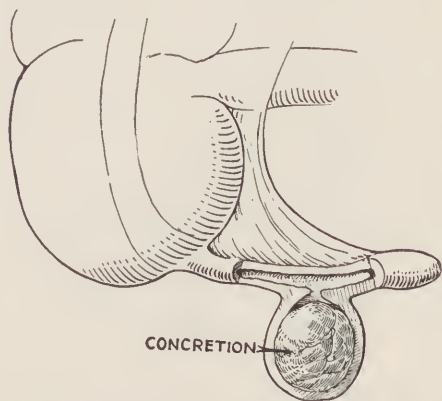


Fig. 791.—Fecal concretion located in an appendicular diverticulum.

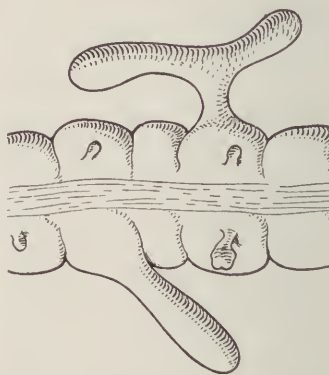


Fig. 792.—Teat and club-shaped diverticula of the colon.

the *rectum* more often than published cases and postmortem statistics indicate.

Acquired diverticula may be *single* or *multiple*, *small* or *large*, *oval* or *irregular* in shape, *soft* or *firm*, confined to a *single* or involve *several* bowel segments, and encountered at any point on the intestinal circumference, but are more common at the *mesenteric border* and sites of *appendices epiploicæ*, which may conceal them.

Sacs may remain inactive for years or at any time become infected and inflamed, causing symptoms frequently mistaken for appendicitis, peritonitis, chronic intestinal obstruction, new growth, or pelvic abscess. That definite symptoms are absent in almost 50 per cent. of cases is indicated by the frequency with which diverticula are unexpectedly discovered during *x-ray* search or autopsy.

The accompanying statistics compiled by Telling show that in

1068 necropsies diverticula were discovered 83 times, of which 39 were *congenital* or *true*—Meckel's—and 44 *acquired* or *false*.

Institution.	Necropsies.	Meckel's diverticulum.	Diverticulum in small intestine.	Diverticulum in large intestine.
Dresden City Hospital....	8,133	8	1	6
Johns Hopkins Hospital...	2,600	15	14	19
Boston City Hospital.....	1,382	11	1	1
Bender Hygienic Laboratory—22.....	953	5	0	3
	13,068	39	16	28

For convenience of study diverticula are classified by the author into *abdominal*, *cecal*, *colonic* (Fig. 799), *sigmoidal*, and *rectal*,¹ since small gut diverticula are rare and seldom cause serious disturbances.

DIVERTICULITIS OF THE CECUM, COLON, AND SIGMOID FLEXURE

Etiology.—In some the etiology of acquired diverticulitis is obvious, but in other cases the causation of intestinal pouchings cannot be explained except on the basis of inherited weakness of intestinal musculature that gives way owing to gas or fecal distention.

Etiology of the condition is not fully understood, but it is known that certain factors induce or predispose the patient to diverticulitis. *Age*, through accompanying disturbed metabolism, weakening of intestinal musculature and chronic constipation complicated by gas and fecal accumulations is an important factor, and *sex* is evidently a predisposing cause, since the disease occurs more than twice as often in men as women.

Wasting diseases—cancer, tuberculosis, colitis, etc.—with intestinal *atrophy* favor the formation of diverticula by impairing longitudinal and circular muscle-fibers so they stretch, break, or separate, allowing the mucosa to herniate through them when pressure is exerted from within; in such cases normal colonic sacculations sometimes become exaggerated and are mistaken for diverticula.

Hemorrhagic infarcts, *worms*, *foreign bodies*, *obesity*—with fat gut wall—*ulcerative colitis*, *dilated intestinal glands*, and other conditions have led to the formation of pouches by perforating, destroying or indenting the mucosa, or impairing intestinal musculature.

¹ See Chapter XLIX for the discussion of Rectal Diverticula, Diverticulitis, and Peridiverticulitis.

SYNOPSIS OF THE AUTHOR'S 7 CASES OF ABDOMINAL COLONIC AND SIGMOIDAL DIVERTICULA¹

Number cases.	Sex.	Age.	Variety and complications.	No. diverticula.	Location.	Result of operation.
1	M.	42	Cord-like remains of Meckel's diverticulum—yolk sac.	1	Extended from umbilicus to ileum.	Complete recovery.
2	F.	52	Large pouchings—diverticula—incident to constipation and fecal impaction.	7	Descending colon and sigmoid flexure.	Immediate marked improvement.
3	M.	49	Diverticulum with vesico - intestinal fistula.	20	Rectosigmoidal juncture.	Temporary fecal fistula; permanent cure.
4	M.	60	Diverticulitis with abscess.	4	Sigmoid flexure.	Recovery in three weeks.
5	M.	47	Diverticulitis with abscess that discharged through the rectum.	1	Rectosigmoidal juncture.	Death from exhaustion three weeks following operation.
6	F.	49	Carcinoma associated with a diverticulum.	1	Sigmoid flexure.	Recovery; death year later from recurrence.
7	M.	63	Diverticulitis of cecum simulating neoplastic tuberculosis.	1	Cecum.	Fecal fistula and death from exhaustion four weeks later.

New growths, constipation, and various chronic obstructive lesions responsible for obstipation, coprostasis, and gas retention are causative factors in diverticula because of accompanying frequent distention, presence of fecal masses and atrophy, or thinning of intestinal tunics.

Diverticula are often encountered at the mesenteric border; some authorities claim *vessel openings* favor herniation, particularly in chronic heart, liver, and other affections accompanied by mesenteric stagnation, while others attribute the formation of sacs to relaxation of connective tissue surrounding the aperture.

Intestinal pouchings occur more frequently at the site of *appendices epiploicæ* (Fig. 797), which undoubtedly are factors in their production, since such points are vulnerable because appendices are continuous with the subperitoneal fat. *Sacs* are often confined to *appendices epiploicæ*, and not suspected until they rupture or are accidentally discovered at autopsy.

¹ See Chapter XLIX for tabulation of the author's cases of rectal diverticula.

The author has several times artificially produced diverticula here by tightly distending the bowel with air, and believes these anatomic structures to be the chief predisposing factors of diverticulitis in patients suffering from any disease accompanied by chronic gas or fecal distention of the bowel.

Diverticula have also followed accidental injuries and operations that weakened the intestinal tunics.

Pathology.—*Congenital* are usually found in the small intestine (Fig. 809), while *acquired* diverticula ordinarily involve the cecum,



Fig. 793.—Multiple diverticula of the colon and sigmoid flexure located at sites of appendices epiploicæ artificially produced by the author through colonic inflation.

colon, and sigmoid flexure, the latter representing the classic type of intestinal pouching.

It is now known that so-called *false sacs* may possess all the bowel tunics instead of being formed by protrusion of mucous membrane through the muscular coat.

Diverticula vary from pea to hen's egg (Fig. 795) size or larger, number from one to a hundred or more, and may be confined to a single or be scattered over several intestinal segments. Pouches may remain healthy or at any time undergo secondary changes—diverticulitis—that may extend to surrounding tissues—*peridiverticulitis*.

Active diverticulitis and peridiverticulitis are characterized by marked connective tissue growth—round-cell infiltration—and later by fibrosis with contraction and consequent intestinal occlusion. The sac wall becomes thickened and firm, and as a result of this and deposits of exudates and cicatricial tissue around it a dense elastic tumor is formed.

Pouches gradually enlarge—usually retaining their peritoneal covering—through gas and fecal accumulations (Fig. 798), and often undergo infection that terminates in an abscess that may rupture into the abdomen through the abdominal wall, or discharge

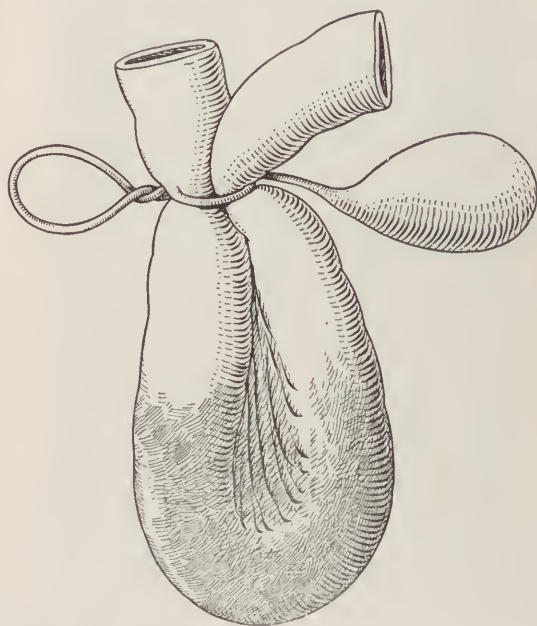


Fig. 794.—Meckel's diverticulum strangulating the ileum.

into the bowel through a fistulous or the original opening, connecting the gut and lumen of the diverticulum.

Occasionally perforation takes place in non-inflamed diverticula that are ulcerated, or have thin walls caused by distention, or through pointed foreign body. In some instances peridiverticular adhesions angulate, twist, occlude, or otherwise distort the intestine by pulling, strangulating, or compressing it, and in such cases coprostasis and auto-intoxication are manifest. Frequently in aggravated cases, as a result of perforation or rupture induced by ulceration, fecal, and gas retention, or emptying of an abscess, a

fistula is formed that discharges into the bowel, vagina, bladder (Fig. 804), or upon the surface of the body; more than one perforation has been observed in multiple diverticula.

As a rule diverticula are located in the lower left quadrant about Poupart's ligament—sigmoid flexure—(Fig. 797) and bulge the skin outward, the abdomen may contain seropurulent fluid or pus; gangrenous areas have been observed in the sac near the juncture of the appendices epiploicæ with the gut.

There is usually thinning of the sac, but this occurs more often at the fundus than at neck of the diverticulum.

Diverticulitis and peridiverticulitis may be *acute*, but are more often *chronic*; because of the size, form, consistence, and macroscopic appearance of the tumor diverticula are frequently mistaken for *carcinomata*, toward which they are undoubtedly a predisposing



Fig. 795.—Large multiple colonic diverticula (Carnegie Laboratory).

factor. In 27 cases of sigmoidal diverticulitis reported by the Mayos cancer was grafted in the diverticulum in 7, and the author has twice observed this unique condition.

Microscopic examination of sectioned diverticula walls shows them composed of mucosa, submucosa, and remnants of muscle-fiber, but in some instances the inner and outer tunics only are demonstrable.

Symptoms.—Small intestinal sacs—excepting Meckel's (Fig. 806)—rarely become inflamed, but 25 per cent. of colonic and sigmoidal pouchings undergo secondary changes that produce definite manifestations.

In the beginning patients suffering from diverticulitis complain of abdominal uneasiness, discomfort, and sinking sensations, digestive disturbances, moderate constipation, and gas accumulation,

but later, when inflammation has extended deeply into or through the diverticulum—*peridiverticulitis*—localized tenderness and cramps, obstinate constipation alone, or alternating with diarrhea, sensation of blocking, fecal impaction, and pain in the sigmoidal region—*left-sided appendicitis*—are troublesome symptoms; finally, when the bowel is almost occluded, there is marked gas—tympanites—and fecal retention, severe pain, muscular rigidity, nausea and vomiting, obstipation or coprostatic diarrhea, leukocytosis, increased pulse-rate, irregular or high temperature—when the diverticulum is infected—and mucus, pus, or blood in the stools.

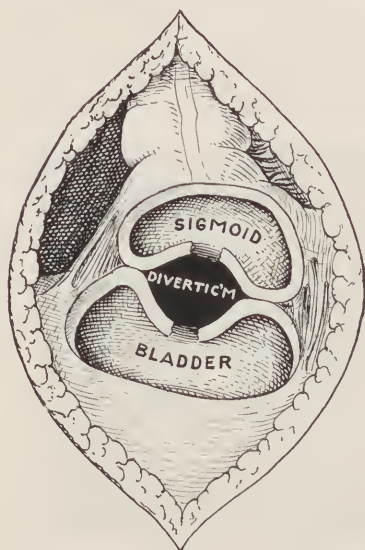


Fig. 796.—Diverticulum complicated by vesicosigmoidal fistula cured after the plan elsewhere illustrated (Fig. 804).

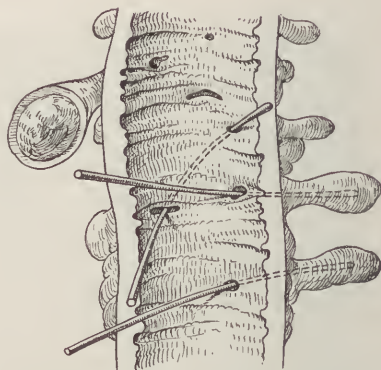


Fig. 797.—Small multiple diverticula of the sigmoid flexure. Note sacs at location of appendices epiploicæ with probes entering their lumen, fistulous sinus, connecting pouches and one diverticulum (left) distended with a fecal concretion.

Where unrestricted perforation takes place from ulceration, gangrene, or rupture the patient exhibits the usual signs of spreading peritonitis; when an abscess is formed continuous localized pain and swelling are in evidence until it is drained, ruptures, or discharges through the diverticular opening in the bowel. Cystitis is troublesome when there is an opening between the bladder and bowel or sac. Between attacks symptoms and size of the tumor diminish, and the swelling is smaller when the sac is temporarily freed of gas, feces, or pus. When there is *transposition* of the sigmoid flexure diverticulitis closely simulates appendicitis.

Diagnosis.—Diverticulitis and peridiverticulitis mimic and must be differentiated from *neoplastic, tuberculosis, chronic appen-*

dicitis, actinomycosis, intestinal obstruction, carcinoma, chronic sigmoiditis, fecal impaction, encysted foreign bodies, disease of the adnexa, chronic abscess, fistula, and vesical tumors.

The majority of sacs (Fig. 797) do not induce symptoms, a few cause slight disturbance, but in typical cases of diverticulitis and peridiverticulitis symptoms and signs of the disease are characteristic. With a history of chronic left-sided inflammation—with periodic exacerbations—and an absence of marked cachexia and loss of weight, one is justified in making a diagnosis of *diverticulitis* when the patient complains of obstipation and diarrhea, localized muscular rigidity, tenderness, pain, and gas retention, pus in the



Fig. 798.—Colonic sacculations simulating diverticula encountered in a woman suffering from obstinate colonic stasis.

urine or feces, a firm oval tumor palpable in the left inferior abdominal quadrant, and when through the sigmoidoscope the mucosa appears smeared with pus, or an opening is discovered through which pus is discharged and a probe can be introduced into the sac. Owing to the frequency with which fistula connects the bladder and diverticula cystoscopy and examination of the urine for pus is advisable.

Radiographic demonstration is often impossible, but where lumen of the diverticulum communicates with the bowel the pouch may sometimes be defined by radiographs (Fig. 799) taken following the administration of barium enemata or meals.

In some cases microscopic examination of the sectioned speci-

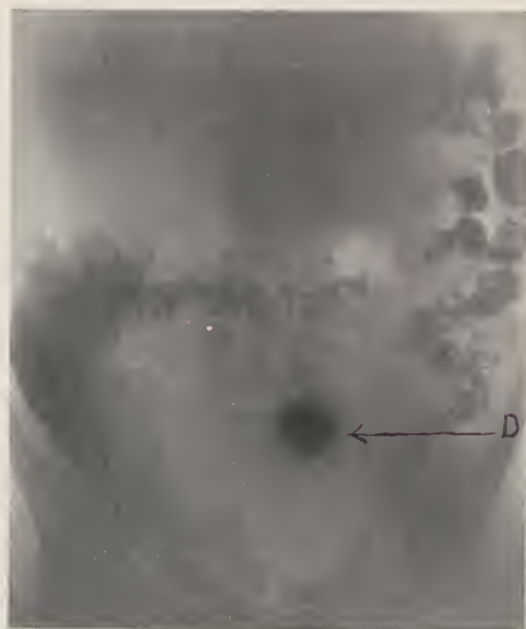


Fig. 799.—Multiple enterocolonic diverticula: *D*, Large diverticulum in the small intestine.

men is necessary for an exact diagnosis, but this is unnecessary since removal of the tumor is imperative in any case.



Fig. 800.—Author's case of multiple diverticula of colon and sigmoid flexure.

Prognosis.—The mortality is *nil* and recovery prompt following removal or infolding of small or large uninflamed inactive pouches;

there is some danger from operations for chronic diverticulitis, and the mortality is rather high in cases operated during acute crisis complicated by marked obstruction, peritonitis, or abscess.

Treatment.—Palliative measures, laxatives, and oils—never purgation—hot fomentations, belladonna, and morphin, fluid diet, and warm high enemata are prescribed to empty and cleanse the bowel, alleviate pain, relieve colic and muscular rigidity, and keep the patient comfortable while he is being prepared for operation.

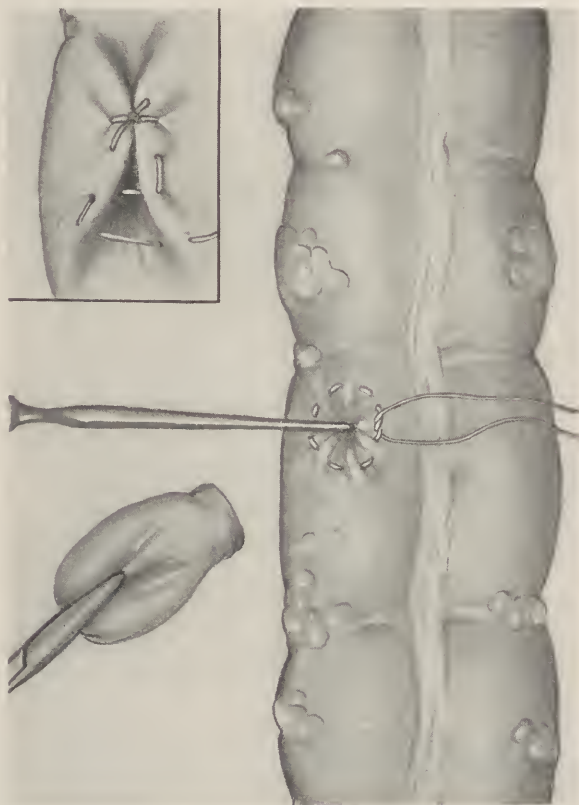


Fig. 801.—Excision of diverticulum and closure of intestinal opening with a purse-string suture. Insert shows a diverticulum being inverted and buried by an infolding suture.

Diverticulitis is a *surgical* condition, since there is no way of destroying the *sac* except by operation. Numerous small and pouches of moderate size that have not undergone secondary changes may be buried by infolding—*coloplication* (Fig. 801, insert), or *excised*, and the stump inverted with a purse-string suture (Fig. 801), or the wound closed where long with through-and-through reinforced by Lembert stitches (Fig. 802).

Removal of sacs and resection of the involved bowel is impracticable when diverticula are numerous and widely scattered and the gut is *short-circuited* (see Chapter XCV). Usually diverticulitis and peridiverticulitis are complicated by infection, and in such cases the abscess is incised, irrigated and drained, and the wound only partly closed after binding adhesions have been destroyed. When there is a fistulous opening between the bowel and bladder and diverticulum, after dissecting the *sac* free and cauterizing edges, the aperture is closed by infolding sutures.

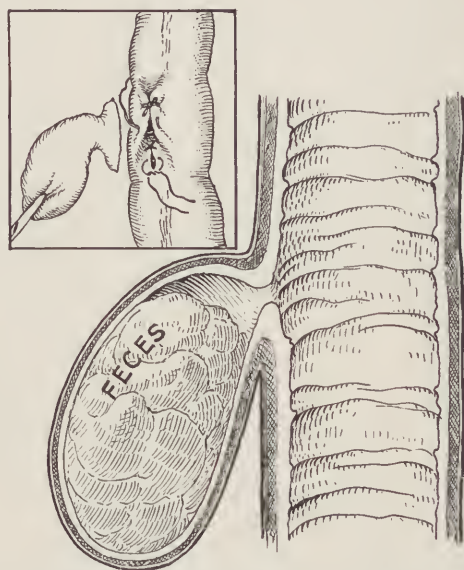


Fig. 802.—Simple method of excising medium-sized colonic diverticulum with elliptic incision and closing gut with a double suture line.

In deplorable cases, where *excision* (Fig. 971) of the diseased bowel is impracticable owing to adhesions, relation of the pouch to other organs, and dangerous condition of the patient because of infection, perforation, or acute intestinal obstruction, a temporary *artificial anus* is formed following opening and draining of the abscess (Fig. 1033).

When feasible, *entero-anastomosis*—*ileoproctostomy* or *ileosigmoidostomy* or *intestinal exclusion*—is substituted for *colostomy* to relieve obstruction and procure daily soft evacuations without the nuisance of having feces discharged through the side (Fig. 1034).

Appendicostomy or *cecostomy* (Figs. 999, 1021) are useful adjuncts in the surgical treatment of chronic diverticulitis, since they provide

for through-and-through colonic irrigation, which heals inflamed and ulcerated areas, frees the bowel of irritants, and facilitates convalescence from auto-intoxication.

Illustrative Case.—**Diverticulitis of the Sigmoid Flexure Complicated by Abscess.**—Male, sixty years old and emaciated, who had suffered from indigestion, constipation alternating with diarrhea and sensations of fulness, and blocking of gas and feces in the left inguinal region for three or four years. When seen patient

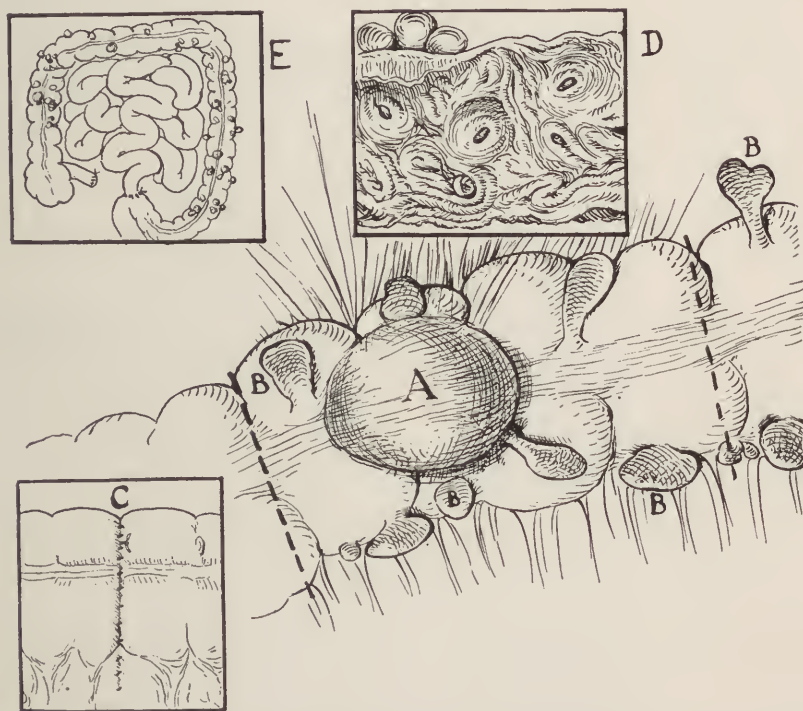


Fig. 803.—Multiple diverticula of the colon, A, B, C, D. The large sac (A) was removed by colonic resection, and C, gut ends being anastomosed by the sutures alone method.

was suffering from pains radiating between the umbilicus and the left lower abdominal quadrant, marked constipation, and had a temperature of 103° F., preceded by a chill.

Examination revealed rigid abdominal muscles, localized tympanites, marked tenderness, and a swelling in the sigmoidal region. A sausage-shaped tumor was felt in the rectovesical pouch with the finger, and sigmoidoscopic inspection showed a congested mucosa and apparent narrowing of the bowel. The abdomen was

opened and a mass large as the fist was found adherent to the anterior parietes, which proved to be gut, inflammatory deposits, adhesions, and a large pus cavity situated at the outer side and behind the sigmoid. After the bowel had been freed from adhesions and straightened out the abscess was incised, evacuated,

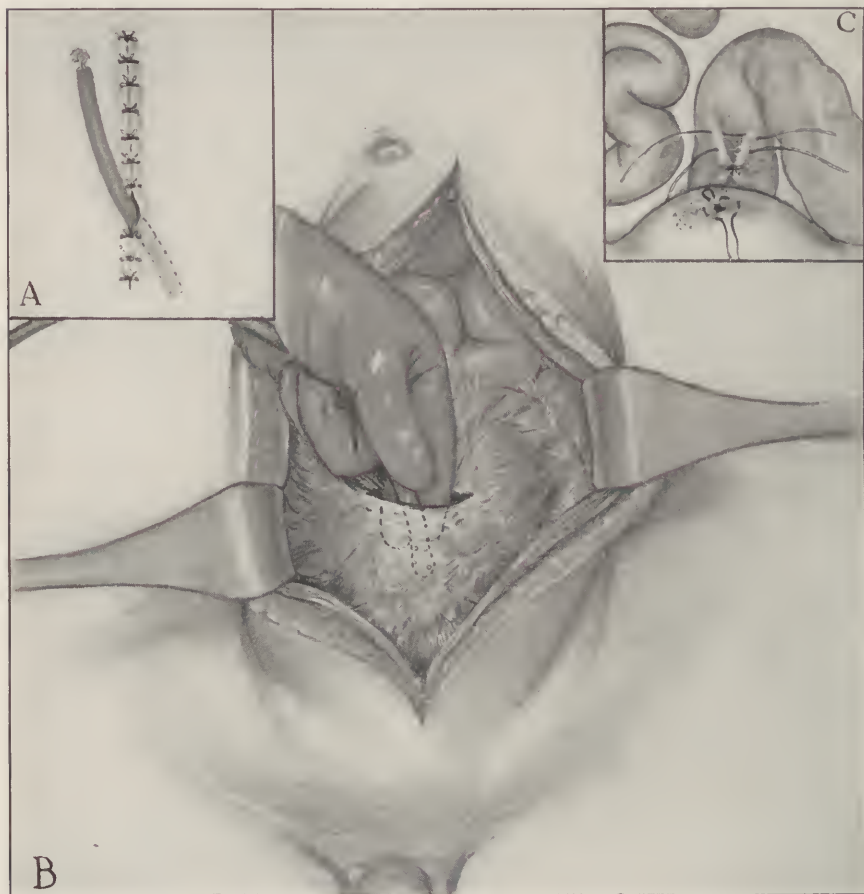


Fig. 804.—Extensive diverticular abscess: *A* and *B* show manner in which the abscess was opened, irrigated, and drained; *C*, technic employed in closing vesicosigmoidal fistula complicating diverticulitis of the sigmoid flexure in a similar case.

and cleansed. By careful probing a small opening connecting the cavity with the sigmoid was located, and perforation had evidently taken place at this point. Examination of the gut revealed three small (hazelnut) and one large (hen's egg) size diverticula. The former pouchings were in the upper third of the sigmoid near

the mesenteric attachment or appendices epiploicæ, and the latter, which proved to be an exaggerated colonic sacculation containing fecoliths, was situated at the side of the sigmoid near its curve and had apparently been caused by constipation, recurring fecal impaction, and giving way of the muscular layers from distention through which the mucosa had become herniated. The small sacs were empty, but the large diverticulum contained semisolid feces, concretions, and pus, which were evacuated by milking the swelling.



Fig. 805.—Partially obliterated Meckel's diverticulum connecting the umbilicus and ileum (Army Med. Museum).

Operation.—Small sacs were snipped off with scissors and wounds cauterized and closed by purse-string reinforced by Lembert sutures; the large pouch, which was almost free from adhesions, was ligated, excised at its base, and the stump inverted as in appendectomy by a double row of infolding sutures. There was no subsequent fecal leakage, the ligatures and remains of the stump were evacuated on the tenth day, the patient was discharged in three weeks, and remained well at the end of six months. Upon the

operating table a diagnosis of diverticulitis with perforation, localized peritonitis, and abscess was made.

MECKEL'S DIVERTICULUM

These congenital cone-shaped pouches (Fig. 805), which extend during fetal life from the umbilicus to the ileum near the ileocecal

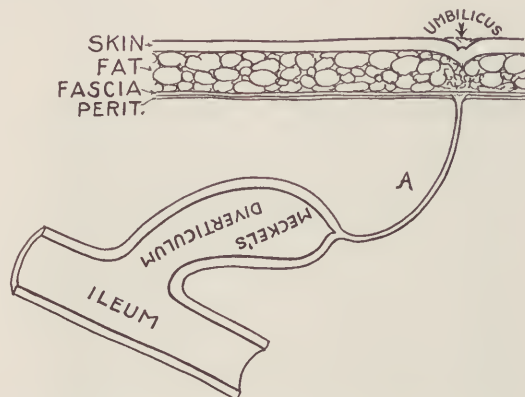


Fig. 806.—Cord-like Meckel's diverticulum connecting ileum and umbilicus.

valve, are vestigial remains of the omphalomesenteric duct. Meckel's diverticula are composed of all intestinal coats—*true* diverticula—variable in size, shape, and length, have a small

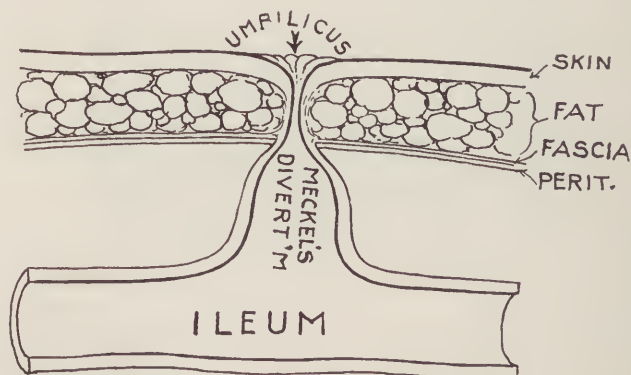


Fig. 807.—Meckel's diverticulum communicating with the surface through the umbilicus.

opening connecting them with the bowel, and may be distended with mucus, gas, or feces. They are encountered in young persons more often than acquired pouches, and may be strictured or cord-like (Fig. 806) when almost obliterated.

Meckel's diverticula sometimes undergo secondary changes, but when they do, gangrene, perforation, intestinal obstruction, or

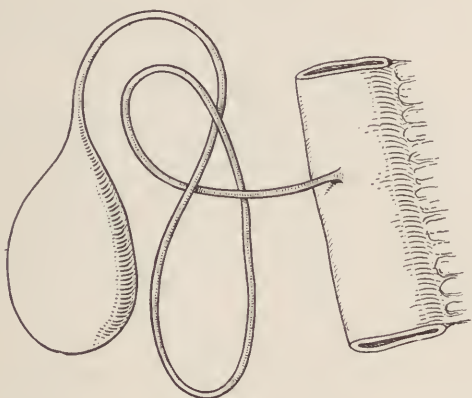


Fig. 808.—Lengthy cord-like Meckel's diverticulum attached to the ileum.

abscess and fistula, with formation of adhesions and kinks, may follow. These pouches frequently compress or *strangulate* a loop of the small intestine (Fig. 794).

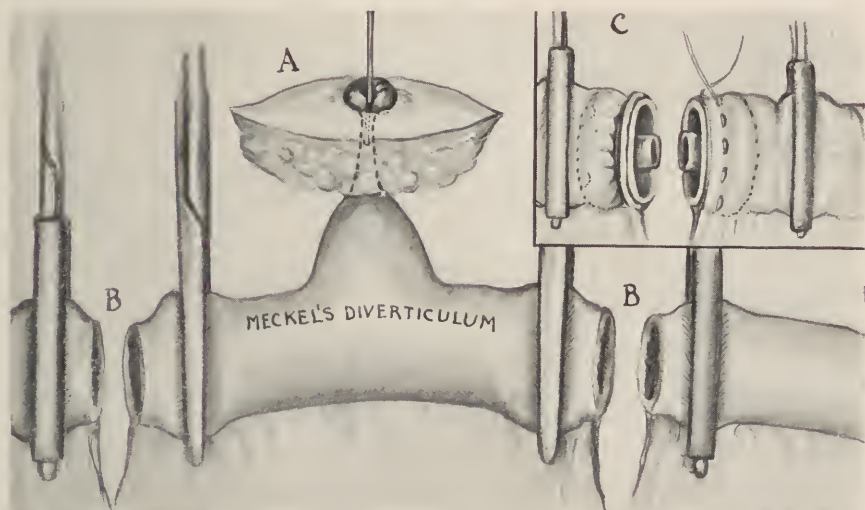


Fig. 809.—Meckel's diverticulum opening (A) at the umbilicus. (B) Diverticulum excised between clamps and (C) gut ends approximated with a Murphy button.

Symptoms of Meckel's diverticulitis—inflammatory or obstructive—are of sudden onset, alarming from the beginning, and difficult to differentiate from those of acute perforation—*e. g.*, appendicitis

or intestinal obstruction. In these cases tympanites is marked, abdominal pain sharp, overlying muscles are tense, and unless quickly relieved, complete intestinal obstruction, fecal vomiting, and collapse occur, or perforation with localized or spreading peritonitis ensue.

Treatment.—Elongated, pedunculated, and cord-like diverticula are ligated, excised, and the stump inverted, as in appendectomy, following liberation of the occluded gut. Large sacs are removed by elliptic incisions and the gut wound closed by through-and-through reinforced by Lembert or deep infolding sutures. It is sometimes necessary to resect the diverticular segment of bowel (Fig. 809) or gut if strangulated.

Chapter LXXXVI

Constipation, Obstipation, Intestinal Stasis, and Auto-intoxication

DEFINITION, GENERAL REMARKS, ACUTE CONSTIPATION

THE conditions enumerated in the chapter heading will be jointly discussed because they are hard to differentiate, often overlap, have many manifestations in common, and the treatment prescribed for one is frequently indicated in the other.

Definitions.—Physicians frequently confuse constipation, obstipation, fecal impaction, and intestinal stasis, and because of this and to help the reader to distinguish between them the author will briefly define each:

Constipation is a chronic state of the bowel marked by delayed, infrequent, or incomplete evacuations.

Obstipation is a type of constipation induced by mechanical obstruction preventing normal passage of feces through the small intestine, ileocecal valve, colon, rectum or anus.

Fecal impaction—coprostasis—is a manifestation of constipation and obstipation characterized by an abnormal collection of retained feces in the colon or rectum consisting of irregular shaped, putty-like masses of large and small, round, or nodulated hard balls—*scybalæ*—that resist expulsion without artificial aid.

Intestinal stasis—auto-intoxication—is a condition resulting from chronic intestinal atony or obstruction accompanied by delayed stools and defective drainage, complicated by toxic manifestations caused by the accumulation of chemical products and *bacterial toxins* in the blood to an extent greater than the emunctories can eliminate.

General Remarks.—Constipation—including obstipation—is a frequent and distressing ailment encountered at any age—and in all countries—that may be inherited or acquired, and prevail without apparent etiology or be caused in a variety of ways.

Medical constipation is a *symptom* of another condition or disease, but manifestations of retained feces often become so distressing that the patient considers alleviation or cure of his costiveness more important than the affection responsible for it.

Some individuals have two or more evacuations daily and suffer marked toxic symptoms, while others go for days, weeks, or a month without apparent discomfort.

The author treated a girl immunized to fecal toxins who emptied the bowel only once in six weeks with enormous high soap-suds injections.

The average normal stool weighs about 6 ounces (180 gm.), is composed of water 75, and solids 25 per cent., is of doughy consistence, light or dark brown color, alkaline in reaction, cylindric in form, about 1 inch (2.54 cm.) in diameter, and 4 to 8 inches (10.16-20.32 cm.) in length, possesses an offensive odor—skatol—and is composed of digestive juices, non-absorbable food residues, bacteria, epithelial detritus, and mucus; all of which are subject to variation depending on exercise, mode of living, food consumed, complicating disease, medication and emotional disturbances; while propulsion of chyme and feces through the stomach, small intestine, colon, and rectum is *involuntary*, normal daily evacuations at a given hour can sometimes be obtained by instructing the patient to cultivate regular hours, eat intelligently, and exercise properly.

A perusal of the etiologic factors enumerated in this and the following chapter will enable the reader to understand why manifestations are so varied, routine treatment is impractical, medical measures often fail, and surgical procedures are frequently effective, the prognosis is good in one case and poor in another, and finally, one patient recovers promptly and another convalesces slowly or not at all.

Manifestations simulating those arising from obstipation and copremia are often encountered in persons suffering from catarrhal and infectious coloproctitis without fecal retention; in such cases symptoms are attributable to infection of the mucosa and deeper coats of the bowel, neighboring structures or distant organs, as well as entrance into the circulation—where there is desquamation of the intestinal epithelium—of bacterial and other toxins. Owing to this it is sometimes difficult to differentiate between toxemia of intestinal stasis and that associated with other affections of the gastro-intestinal tract.

Trifling conditions like fissure or hemorrhoids may induce aggravated stasis, whereas extensive lesions, as matting together of the large intestine, broad adhesions, and sharp angulation, may not be complicated by coprostasis or manifestations of auto-intoxication; again, a small quantity of feces remaining in the bowe for a short time produces distressing auto-intoxication in one patient, while in another the colon or rectum may remain filled

with feces for days, weeks, or even months without the sufferer exhibiting symptoms of fecal toxemia, owing to his idiosyncrasy or immunity arising from recurrent coprostasis. However, the majority of obstipated patients worry greatly over their symptoms, and are anxious to submit to a course of treatment or operative interference when necessary.

Medical—atonic—and surgical—mechanical—constipation have been freely discussed in current literature, text-books, and medical societies, yet its manifold etiology, different types, far-reaching results, and rational treatment are apparently not understood by the many physicians who prescribe a routine treatment for the condition.

Failure to obtain a cure is often due to the attendant's effort to secure daily movements by administering a cathartic or enema instead of attempting to ascertain and remove the cause of delayed or insufficient evacuations, which would permanently relieve the patient.

Chronic constipation is quickly cured in some, but in other instances weeks or months of persistent treatment are required to eliminate the cause, establish normal peristalsis, get rid of toxins, make the colon, rectum, and anus functionate properly, and procure normal daily stools.

Obstipation is more quickly relieved than atonic constipation because the obstructing lesion responsible for it is quickly eliminated by operation, but some cases require postoperative treatment, embracing dietetics, in- and out-door exercise, vibratory treatments, hydrotherapy, and electricity to restore tone to the colon and rectum impaired by gas distention, coprostasis, and bowel inaction incident to the block.

Medication and enemata may be employed to procure prompt evacuations in urgent cases, but are seldom curative and are replaced by psychotherapy, physiotherapy, or an operation when delayed stools are the result of bowel blocking.

Once begun, treatment is continuous, since frequent interruptions postpone a cure. The time required to permanently relieve chronic atonic and surgical constipation is uncertain and physicians must be careful about naming a time, and the patient should be told that efforts are not being made merely to procure immediate evacuations, but to cure the underlying pathology.

Obstipation which occurs more frequently than is conceived, does not respond to medical treatment, and the obstructing lesion is promptly removed by operation reinforced by physical therapeutic measures when indicated.

Routine treatment of constipation is absurd because the condition may be medical or surgical, and accompanying manifestations vary in different cases.

Rapid progress will not be made in the treatment of atonic constipation and obstipation with auto-intoxication until physicians familiarize themselves with the anatomy and physiology of the gastro-intestinal tract, discussed elsewhere, and fully understand the process of defecation (see author's work on Constipation, Obstipation, and Intestinal Stasis, 1916).

Costive patients suffering from toxic manifestations readily submit to rational medical treatment or surgical intervention when the cause of their trouble and character of the operation required to correct it has been pointed out.

Medical—atonic and surgical constipation—obstipation may be either *acute* or *chronic*, the latter being by far the more common.

Acute Constipation.—This condition, which is *rare* and seldom occurs except in the aged, may be caused by prolonged astringent medication or opiates, senility, neurogenic disturbances, neglect to empty the bowel, accumulation of seeds, fruit stones, grape hulls, and other foreign bodies; changes in water, food, climate, and inconveniences associated with travel; acute infections and other disease; and intestinal kinks, volvulus, adhesions, intussusception, hernia, tumors, misplaced organs, and acute inflammatory or perforative disease, or other lesions that obstruct or compress the intestine or retard or paralyze peristalsis.

Fissures, ulcers, hemorrhoids, and other anorectal lesions that irritate the sphincter or levator ani muscles are also an occasional cause of this condition.

The more important *symptoms* of acute constipation mimic those of intestinal obstruction from any cause—inability to procure an evacuation, straining when the trouble is low down, abdominal distention and soreness, gastric irritability and indigestion, coated tongue, irregular or high temperature, fast thready pulse, and other grave manifestations when caused by serious lesions involving the gut.

The *diagnosis* is easy when the block is *low down* and feces collect in the rectum, because they and the cause of fecal retention are easily detected by digital and proctoscopic examinations.

When the etiologic factor, medical or surgical, is high or located above the rectosigmoidal juncture beyond reach of the sigmoidoscope an accurate diagnosis is frequently impossible unless the abdomen is opened for direct inspection of the bowel.

In the *treatment* of acute constipation the object to be obtained

is to quickly procure one or more evacuations, and relieve the patient of the retained feces or obstruction.

Surgical interference is always indicated when the trouble is due to a congenital deformity or other types of mechanical obstruction, but an operation is seldom necessary for the relief of acute costiveness from other sources.

In the majority of cases acute constipation is quickly relieved by the liberal use of mineral waters—Carbana, Hunyadi János, Saratoga, etc., or one of the saline cathartics, such as Carlsbad, Rochelle, Epsom or Glauber's salts, Seidlitz powder, or phosphate of sodium administered in doses varying from $\mathfrak{z}\text{j}$ to viij (4.0–30.0). Compound licorice powder is another serviceable remedy in this class of cases when given in 1- or 2-dram (4–8) doses in a little water at night.

Castor oil is often employed in the treatment of acute constipation because when prescribed in amounts varying from $\mathfrak{z}\text{ss}$ to $\mathfrak{z}\text{j}$ (15–30) it facilitates copious evacuations and causes little if any discomfort.

With the aid of from one to four compound cathartic or compound colocynth pills the bowel can usually be quickly and effectively cleared.

In acute constipation complicated by biliousness calomel in fractional doses, or blue mass, will render good service, especially when the intestine is washed out on the following morning by one of the saline cathartics.

In addition to the remedies advised, one or more of the laxative and cathartic medicines elsewhere suggested to give temporary relief in chronic constipation will also be found useful in the treatment of acute costiveness.

Violent purgatives, like elaterium, gamboge, and croton oil, are contraindicated because they are injurious, induce a great deal of discomfort, and, further, because the constipated state can be overcome with more agreeable and less harmful drugs. When medication fails to accomplish the desired object one is justified in resorting to small or copious high and low enemata of water, soapsuds, oil, or glycerin.

In cases of acute constipation, where stools have been delayed several days and the bowel has become impacted with feces, something more radical is necessary; under such circumstances a vegetable or mineral oil is prescribed in liberal doses two or three times daily, and in the meantime copious injections are given to soften and bring away the excrement. When fecal accumulations are lodged in the cecum or transverse colon this treatment is con-

tinued until the desired result is accomplished. When the sigmoid flexure or rectum becomes impacted with large fecal masses and treatment suggested fails to dislodge and expel them, energetic measures are in order. When the mass is situated low down it is broken up with the finger or handle of a spoon, but if situated in the upper rectum or sigmoid flexure it is necessary to introduce the proctoscope or sigmoidoscope and to divide the fecal mass into small pieces with the aid of long forceps or a gouge. Once broken up it is quickly dislodged and washed out with soapsuds injections.

When, however, it appears that constipation is due to *mechanical obstruction*, this may be corrected or removed by the aid of one of the *surgical procedures* described in the following chapters.

Once an acute attack has been relieved, precautions must be taken against recurrence of the trouble, which, briefly stated, consists in regulating the diet, prescribing laxatives, and having the patient eat at regular hours, empty the bowel at a given time daily, and employ copious soapsuds or ox-gall enemata when feces have a tendency to re-collect.

Patients may be kept fairly comfortable with palliative measures, but recurrence of acute constipation cannot be prevented when fecal retention results from intestinal kinks, ptosis, adhesions, Jackson's membrane, volvulus, intussusception, cecum mobile, tumors, or pressure from without the gut, unless the lesion responsible for acute coprostasis is exposed and eliminated by operation—*cecoplication, cecopexy, colopexy, division of adhesive bands, removal of Jackson's membrane, entero-anastomosis, or colectomy*, procedures described and illustrated in succeeding chapters.

Chronic Constipation.—Owing to the greater importance of chronic constipation, the following chapter has been set apart for a detailed discussion of this frequent and important condition.

Chapter LXXXVII

Chronic Medical—Atonic—Constipation

ATONIC, SPASTIC, PSYCHIC

Atonic Constipation.—This type of constipation is prevalent, has a varied etiology, and comes on insidiously.

Medical constipation may be subdivided into the *atonic*, *spastic*, and *psychic* varieties.

So-called atonic constipation is thought to be very common, but it is questionable if it occurs as frequently as believed, since it is impossible to demonstrate intestinal atony.

In practically *one-fourth* of the author's cases infrequent and incomplete evacuations were induced by mechanical defects of the ileum, ileocecal valve, colon, sigmoid flexure, rectum, or anus; proof of which was found in the curability of constipation by operation after other therapeutic measures had failed to procure regular normal evacuations.

Etiology.—The causes of atonic constipation may be *predisposing*, *determining*, *psychic*, *hereditary*, or *acquired*.

Heredity undoubtedly may play a part in the production of costiveness, evidence of which is the frequency of the condition in infancy and childhood, and characteristics inherited from parents, such as gourmandizing, careless habits, indolence, and constitutional or developmental bowel defects.

Sex.—Women suffer frequently from constipation because they are not active, lace tightly, are careless about going to stool in public places, and because of pregnancy, the menopause, or displacement of or disease of the uterus or adnexa which often interferes with regular complete evacuations.

Age predisposes to constipation because elderly persons have a lower vitality, atrophied musculature, poor assimilation, lessened glandular activity, eat little, digest their food imperfectly, fail to exercise or suffer from organic diseases that diminish fluidity of the feces, or have an enlarged prostate, hemorrhoids, or malignant growth that interferes with the movements.

Infants and children are prone to costiveness owing to artificial, irregular, or improper feeding, failure of the mother to procure daily stools, or resorting unnecessarily to purgatives and enemata

to obtain evacuations, and frequently because they suffer from congenital bowel defects that interfere with peristalsis and propulsion of feces through the colon, rectum, and anus.

Occupation and Environment.—Farmers and open-air workers are less often constipated than in-door workers. Undoubtedly work or exercise in the fresh air amid pleasant environment is conducive to regular evacuations. Occupations such as conductors, engineers, mail clerks, etc., which prevent eating at regular hours and emptying the bowel when a desire to stool is manifest, are also conducive to constipation, as are those which compel the individual to work in paint, metal, chemical or stone factories, owing to the retarding action of the chemical, metal, or dust inhaled or absorbed.



Fig. 810.—Study in rectocolonic morphology in a case of atonic constipation.

The **upright posture** favors enteroptosis, crowding of organs into the pelvis, clogging of the bowel, and formation of hemorrhoids, conditions favoring fecal retention or incomplete stools.

Chronic invalidism predisposes to costiveness because of the patient's lack of exercise, remaining in bed, taking opiates or astringents, relying on cathartics or copious injections; or else the disease from which he suffers may interfere with peristalsis, diminish intestinal and biliary secretions, or obstruct the intestine.

Weakening of abdominal muscles the result of obesity, pregnancy, disease, accidental injury, operation, invalidism, atrophy or paralysis diminishes the expulsive power of the gut and favors constipation and fecal impaction.

Intestinal atony associated with atrophy induced by gourmandizing, careless habits, indolence, cathartics or enema habit,

disease of the brain or cord, colonic distention, adhesions, neurogenic disturbances, or anything that fatigues or stretches the intestinal musculature may cause moderate or persistent constipation, since it is accompanied by diminished glandular secretion, loss of muscular tone, and often ballooning (Fig. 814) of the colon or rectum.

Irregular Hours for Evacuations.—Healthy persons have a movement daily, preferably after breakfast. Frequently constipation results from carelessness in not going to the toilet at regular times, persistently ignoring urgent desire to stool owing to business or social engagements, and postponing defecation because of inconveniently located, uncomfortable, improperly constructed or unclean toilets (Figs. 811, 812).



Fig. 811.—Position of the body on ordinary lavatory seat, which makes defecation difficult.



Fig. 812.—Position of the body on modified lavatory seat, which facilitates defecation by compressing the bowel against the thighs (Klopper).

When desire to stool is regularly heeded satisfactory movements occur, but when nature's warning is repeatedly ignored fecal retention ensues, and by trauma *obtunds* sensibility of the mucosa, and as a result feces collect in the rectum without producing a desire for an evacuation.

Drug and Enema Habits.—The pernicious habit of resorting to *drugs* or copious high *enemas* augments constipation that could be relieved or cured by suggestion, exercise, proper diet, massage, water drinking, etc., because patient or physician seeks quick evacuations without contemplating results. Many injurious *sure-cure* remedies are on the market, and some individuals take every-

thing prescribed by anyone for constipation without knowing its value.

Drugs aggravate constipation because the patient relies on them instead of his efforts to obtain daily movements, with the result that peristalsis and glandular secretion become inactive unless stimulated by a strong cathartic, the dosage of which must be gradually increased.

Enemata are indicated to promptly empty the bowel when stools have been delayed, and colon or rectum is filled with hardened feces.

Habitually overloading the colon with water—2 to 6 quarts—to procure evacuations is injurious because frequent large high injections recommended by those having patented syringes to sell (Fig. 813) distend the gut and lead to enteroptosis, angula-

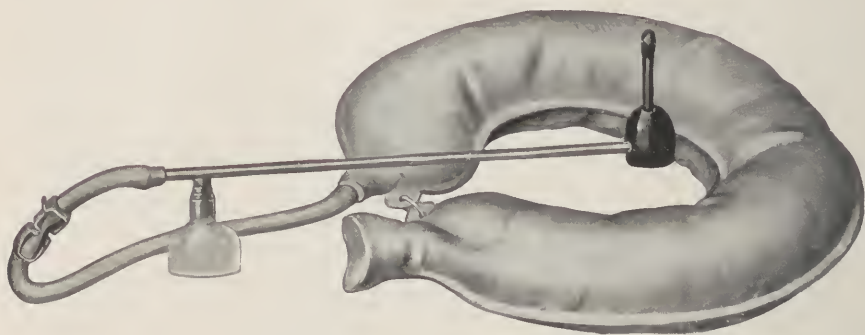


Fig. 813.—Jamison's seat syringe.

tion, dilatation, or intestinal atony accompanied by diminished muscular tone and glandular secretion, which aggravate the constipated state.

Chemical Causes.—Astringent chemicals—copper, lead, alum, iron, lime, etc.—entering the body through inhalation, the skin, mouth, or rectum are responsible for the constipation observed in painters and workers in chemical and metal factories. These foreign substances interfere with movements by deadening nerve ends and centers, diminishing intestinal secretions, weakening peristaltic contractions, or clogging the bowel where bismuth and other non-soluble agents are taken in large doses for a considerable time to relieve diarrhea or other gastro-intestinal affections.

Pericolitis, Colitis, and Perisigmoiditis.—Constipation is induced by these conditions when the inflammatory process extends deeply into the mucosa or musculature, causing the bowel to become

rigid or fixed to neighboring structures through the formation of exudates or adhesions.

Membranous colitis is invariably accompanied by enterospasm which retards evacuations, and catarrhal proctitis is frequently associated with persistent constipation.

Dietetic Causes.—Gourmandizing is frequently responsible for costiveness, and the size, consistence, frequency, and regularity of stools are influenced by the quantity and character of food consumed. An abundance of water, fruit—containing tartaric and citric acids—and substances composed of oily constituents—butter, cream, and bacon—consumed in connection with a liberal vegetable diet favor copious, soft, regular evacuations. Highly seasoned and concentrated foods that leave a small residue are conducive to constipation, while coarse vegetables in liberal amounts fill the bowel and stimulate glandular and peristaltic activity, and encourage regular stools when sufficient water is taken with them. Elsewhere¹ the author has listed foods *permitted* and foods *prohibited* in the treatment of constipation.

Miscellaneous Causes.—Affections that restrict movements of the diaphragm favor colonic inactivity; diseases of the liver, gall-bladder, pancreas, and bile-duct that modify the succus entericus may be associated with constipation or obstipation, for bile increases fluidity of the feces and stimulates peristalsis. Constipation may also be a complication of invalidism and exhausting febrile diseases that occasion loss of water.

Psychic Influences.—Anger, grief, and fright may induce constipation, which is invariably aggravated by worry and despondency observed in neurasthenia and insane patients.

Regular habits and concentration of mind in an endeavor to expel feces immediately a desire to stool is felt is conducive to regular movements. Cures by Christian Science healers show the influence of mind over the bowel, and the author has relieved or cured many nervous individuals of constipation through ordering a placebo or suggesting to the patient that if he would go to the toilet at a prescribed time after having a treatment he would have an evacuation, which often worked.

In conclusion, it may be said that any developmental condition, disease—local or general—dietary indiscretion, or irregularity in manner of living, etc., that hinders development of the colon, rectum, or anus minimizes peristalsis, diminishes biliary or intestinal secretion, prevents propulsion of feces through the colon, rectum, or anus, leads to concentration of the fecal residue, inhibits nerve

¹ Gant, Constipation, Obstipation, and Intestinal Stasis, p. 213.

mechanism of the bowel, intestine, weakens intestinal musculature, induces colonic enterospasm, causes irritability of the sphincter and levator ani muscles, or in any way interferes with defecation must be considered a factor in the etiology of atonic constipation.

Symptoms.—The manifestations of atonic constipation are many, varied, and may be sufficiently distressing to partially or totally incapacitate the patient; the costive state toxemia with accompanying fecal retention and ballooning of the rectum (Fig. 814) may be an etiologic factor in anemia, arthritis, pyorrhea, ulcerated gums, focal infection, and other serious diseases discussed in the symptomatology of obstipation and intestinal stasis considered in the following chapter.



Fig. 814.—A, Radiograph of dilated or ballooned rectum; B, ileocecal valve incompetence.

Symptoms of ordinary constipation may be *acute* or *chronic* and vary in severity, depending on duration of the condition, degree of fecal retention, complicating disease, neurogenic disturbances, idiosyncrasy of the patient, and measures taken to procure evacuations.

Some individuals have two movements daily and complain severely where there is but slight retention, while others have only one stool weekly, monthly, or less often, and do not exhibit symptoms of auto-intoxication, indicating they have become immune to enormous fecal collections.

Usually constipation comes on gradually, time clapsing between stools increases, defecation becomes difficult and feces more firm and nodular, causing discomfort when evacuated unless coated by mucus.

Constipation and accompanying manifestations may be *continuous* or *intermittent*, and the color, consistence, size, and form of evacuations are modified by the diet, amount of water con-

sumed, medication, nervous or psychic disturbances, and sphincteric irritability.

In addition to infrequency, incompleteness, or abnormal appearance of evacuations the average constipated individual complains of or exhibits some of the following: *systemic, reflex, or local symptoms*.

Constitutional Symptoms.—Named in the order of their importance, systemic manifestations of delayed and incomplete stools in a series of cases are: *frontal or so-called sick headache, malaise, vertigo, inability to concentrate, disinclination for work or pleasure, irritability, despondency, insomnia, furred tongue, foul breath, bad taste, anorexia, sallow complexion, dark blotches or other dermatologic manifestations, coprostatic fever, anemia, indicannuria, dark colored veins* the result of increased oxalates and urates, *poor circulation, flatulence, eructations, nausea, malnutrition, rheumatic pains, brittle hair and nails, weakened musculature, slightly increased or subnormal temperature and lowered blood-pressure.*

Neurogenic and Reflex Symptoms.—Derangement of the nervous system may be secondary to or cause constipation. Costiveness is observed more frequently in nervous, hysteric, and insane persons than normal individuals, and distressing neurogenic phenomena frequently develop in patients suffering from constipation or intestinal stasis complicated by auto-intoxication.

In addition to neurogenic symptoms previously mentioned, constipated subjects often suffer from *neuralgia, neuritis, hypersensitiveness, chorea, epilepsy, neurasthenia, hypochondriasis, feeling of impending danger, bad dreams, nocturnal emissions, gastro-intestinal irritability, convulsions*—infants and children—and reflex disturbances in neighboring and distant organs.

Local Symptoms.—Local disturbances arising from constipation, accompanied by fecal impaction or auto-intoxication, may be manifest in the *abdomen, pelvis, or anorectal region.*

Prominent *abdominal* symptoms are *gastro-intestinal or colonic soreness and sensitiveness, enterospasm, colic, tympanites, borborygmi, regional abdominal pain and tenderness* on pressure, and in the presence of marked coprostasis the patient manifests *muscular rigidity, restlessness, increased pulse-rate, nausea, vomiting, singultus, anxiety*, and in extreme cases indications of *acute* intestinal obstruction.

Colonic ptosis, angulation, volvulus, dilatation, adhesions, and paresis are occasional complications of aggravated chronic constipation with prolonged fecal impaction.

Reflex pelvic disturbances, such as pain in the region of the

ovaries, uterus, ureter, bladder, prostate, urethra, scrotum, penis, and sacrum, are more frequently the result of constipation than is appreciated, and may be incident to auto-intoxication, infection, or pressure exerted upon neighboring organs, structures, or their nerve mechanism by impacted fecal masses in the sigmoid flexure or rectum.

The chief *anorectal* manifestations are *incomplete evacuations*, associated with *coprostasis*, *sensations of fulness and weight* in the bowel, *straining*, *frequent desire to stool*, often with inability to *defecate*, *ballooning* of the rectum, *patulous* or *tightly constricted anus*, *spasm of the levator ani* or *sphincter muscle*, *obtunded*, *hyper-sensitive*, or *congested mucosa*, *proctitis*, *burning pain*, and pathologic changes such as *ulcers*, *fissures*, *hemorrhoids*, *procidentia recti*, and *hypertrophied rectal valves*, affections that, in turn, may induce or aggravate constipation.

Intolerable *pruritus ani* is a common symptom of chronic constipation and may be reflex in some, or caused by stretching of the anus or irritation of the mucosa in other instances.

Colitis, *sigmoiditis*, and *proctitis* are frequently associated with or caused by imperfect evacuations through bruising, irritation, or infection of the mucosa by fecal accumulations and their contained irritants and bacteria.

The symptomatology of constipation would be incomplete without mentioning *diarrhea*, since persistent watery or semisolid movements containing mucus or blood, or diarrhea alternating with constipation, is an occasional manifestation, and is initiated through toxins and bacteria, or caused by trauma, obstruction, ulceration, or increased peristalsis consequent upon irritation or pressure exerted by retained fecal masses.

Diagnosis.—Constipation is readily diagnosed by physician or patient, but in many cases it is difficult to determine the *etiology*, since one or many factors may enter into its causation.

A knowledge of the *anatomy* of the gastro-intestinal tract (Fig. 650), the *physiology* of digestion, and act of defecation is indispensable to a complete understanding of constipation and obstipation, but to avoid repetition the reader is referred to Chapters LIX, and LX for a review of these subjects.

It is necessary to elicit a clear history and ascertain how long the patient has been constipated, whether it is intermittent or continuous, length of time between evacuations, color, consistence, amount, and shape of movements, whether the subject has a lack of or a frequent desire to stool, complains of weight, fulness, straining, tenesmus, sphincteric spasm, or pain incident to def-

ecation, and if feces are covered or mixed with mucus, pus, or blood.

It is advisable to find out if the patient has been afflicted with peritonitis, ulcerative colitis, typhoid fever, appendicitis, disease of the uterus or adnexia, intestinal obstruction, hepatic affection, cholecystitis, or other disease that may partially or completely block the bowel, modify peristalsis, diminish intestinal secretion or interfere with defecation, and if the sufferer responds to psychic

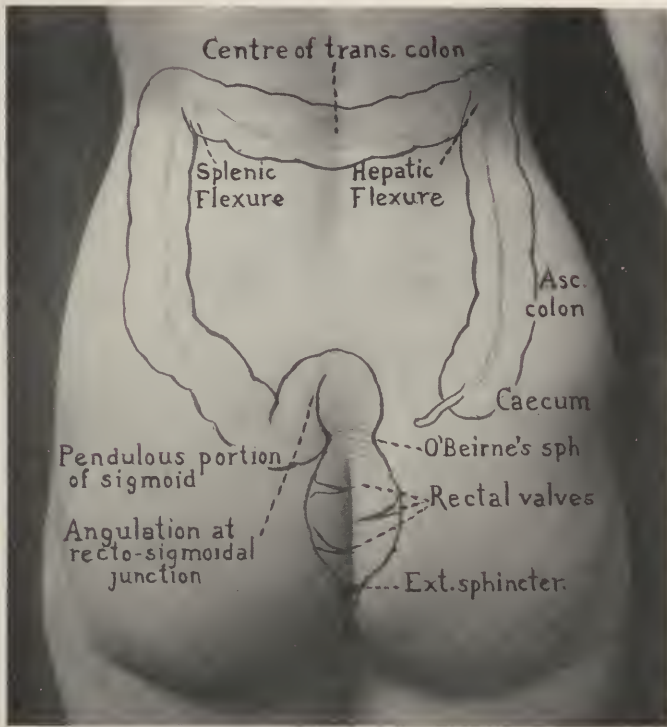


Fig. 815.—Diagram of colon, rectum, and anus, showing points in the bowel where passage of the fecal current is most frequently interfered with.

impulses, exhibits nervous phenomena, or is afflicted with some other condition that inhibits bowel activity through reflex manifestations, weakens intestinal musculature, or modifies intestinal secretions.

General inspection of the patient and careful examination of the abdomen, viscera, pelvic organs, rectum, and anus must not be omitted, for in this way one determines if the nose, throat, or teeth are infected, the abdomen enlarged, flabby, or protuberant, and

whether the patient is cachectic, emaciated, deformed, or suffers from skin affections.

With the aid of superficial and deep palpation one ascertains if the abdominal wall is thin or thick, rigid, sags, or is more prominent at one point than another; if the stomach, intestines, or abdominal or pelvic organs are displaced, enlarged, or involved by tumor formations, if there are tender or painful spots, and determine the size, location, mobility, and consistence of impacted fecal masses in the colon and sigmoid flexure.

Percussion is valuable for locating gas accumulations, tumor, or fecal masses, indurated areas, hepatic and splenic enlargements, outlining displaced viscera, and determining the presence of abdominal fluid and peritonitic inflammation.

Auscultation is useful for eliciting gurgling sounds, aneurysms, hissing of gas, and trickling fluid.

Inflation of the colon with air or gas with aid of percussion and palpation is of assistance in differentiating atonic constipation from obstipation, since it enables one to determine the size, location, and mobility of the bowel, to isolate tumors, strictures, and occluded segments of gut.

Transillumination of the sigmoid has proved of little value in the author's hands.

x-Ray and Fluoroscopic Examination.—These agents are more useful in the diagnosis of *obstructive* than *atonic* constipation, but in either condition are unreliable unless they confirm findings of other diagnostic measures, for unnecessary operations are often performed as a result of erroneous conclusions drawn from them. In some cases fluoroscopic inspection of the gastro-intestinal tract and a study of *stereoradiographs* made subsequent to test-meals or projection of bismuth or barium into the bowel enable one to trace feces through the intestine, observe whether they are retained in a particular segment of gut unduly long, and permits the examiner to form an opinion as to whether delayed or incomplete evacuations are due to defective peristalsis, impoverished secretion, or adhesions, kinks, stricture, tumor, foreign body, or displacement ballooning (Fig. 814) of the bowel, which blocks the gut and interferes with the propulsion or evacuation of feces.

Rectocolonic Enemata.—Injections rationally employed are valuable in the diagnosis of constipation and obstipation because they aid in determining the point in the large bowel or rectum at which feces are arrested or passed with difficulty.

When a movement is procured by a few ounces the disturbance is in the rectum; when a pint is required, feces accumulate in the

lower sigmoid; but when a 2-quart or large enema is necessary to evacuate retained feces, it indicates the block, defective peristalsis, or lessened secretion of mucus is in the cecum or colon. If blood, pus, excessive mucus, tissue *débris*, or food remnants are encountered in the return fluid one forms an opinion as to the cause or disease complicating constipation.

Information regarding the location of neoplasms, impacted fecal masses, inflammatory exudates, dilatation, or misplaced bowel is obtainable by palpating the water-filled colon and sigmoid flexure.

Macroscopic and Microscopic Examination of Feces.—Gross inspection of stools reveals whether they are normal in color, amount, consistence, and shape, and if they contain abnormal substances, since they are modified by drink, food, medication, abnormal bile, pancreatic secretion, and gastro-intestinal juices, inflammatory and ulcerative affections of the mucosa, stricture, cancer, angulation, or muscular contraction that delay passages or alter appearance of the fecal bolus.

Macroscopic examinations sometimes reveal fecoliths, enteroliths, biliary and pancreatic calculi, or foreign bodies in evacuations that influenced constipation.

Microscopic inspection of feces is of little diagnostic value in constipation further than to ascertain if food residue contains an abnormal amount of vegetable or meat fibers, chemicals, or undigested food that might induce delayed or incomplete evacuations, or the presence of parasites, increased number of bacteria, pus, or blood.

Examination of the *stomach contents*, *blood*, and *urine* may be indicated in aggravated cases of constipation complicated by gastro-intestinal disturbances or systemic diseases.

Examination of the blood reveals the degree of anemia, changes in metabolism, the presence of infection, lead-poisoning, parasites, or persistence of auto-intoxication.

Chemical, macroscopic, and microscopic examination of the *urine* determines its color, concentration, odor, specific gravity, urea, excess of indican, albumin, sugar, casts, pus, or bacteria, etc.

Analysis of the stomach contents is necessary in chronic diarrhea, but seldom required in constipation.

Examination of the Sigmoid Flexure, Rectum, and Anus.—A careful study of the lower bowel in costive individuals often shows the rectum flabby, ballooned (Fig. 814), or presence of a lesion that interferes with defecation, and enables one to locate the point at which feces are arrested following their escape from the colon and sigmoid flexure.

Digital examination following an enema helps to test muscular irritability, ascertain caliber of the anal canal, presence of indurated areas and fistulous openings, palpate rectal valves, and locate an ulcer, fissure, stricture, tumor, or other anorectal affection aggravating or causing constipation. Insertion of the finger lubricates the mucosa and prepares the bowel for insertion of the proctosigmoidoscope.

Proctoscopic and sigmoidoscopic examination of the patient in the knee-chest posture with the bowel inflated enables one to determine if the muscular ring at the rectosigmoidal juncture be normal, the rectal valves, levator ani or sphincter muscle hypertrophied, the rectum occluded by neoplasm or stricture, contains a foreign body or fecal impaction, and if the mucosa is inflamed, ulcerated, or smeared with mucus, pus, and blood.

Anoscopic has superseded **specular** examination of the anal canal because introduction of the anoscope (Fig. 71) causes less discomfort, and through it one obtains a better view of polyps, hemorrhoids, constrictions, enlarged papillæ, inflamed crypts, blind fistulæ, ulcers, fissures, and other lesions that interfere with defecation or excite muscular spasm.

Differential Diagnosis Between Chronic Atonic Constipation and Obstipation.—Often it is impossible to distinguish between constipation and obstipation, and sometimes both conditions prevail in the same case.

Constipation is of gradual onset and usually the result of dietetic indiscretion, indolence, careless habits, and ignoring repeated desire to stool.

Obstipation more frequently develops in middle age or old people, commences suddenly, is intermittent, rapidly increases in severity, often alternates with diarrhea, and the stools are voided flat, ribbon-like, grooved, or in short or long pieces unless retained, when they are evacuated as scybalæ, coated with mucus, pus, or blood; mechanical constipation—obstipation—is accompanied by localized pain, tenderness, and gas accumulations, and is aggravated by purgation.

Treatment.—Routine treatment is impracticable owing to multiplicity of causes and varying symptoms of atonic constipation, and because what relieves one fails to benefit another patient, though apparently both are afflicted in the same way.

Therapeutic measures are varied to meet the sufferer's desire, since one individual seeks *temporary relief*, while another wishes a *permanent cure*, and is willing to devote the necessary time and expense to achieve it.

To obtain best results the patient must surrender himself to his physician for the necessary length of time and fully carry out instructions, since nothing is gained by an occasional office visit and indiscriminately resorting to drugs and enemata to obtain daily evacuations.

Cathartics and *enemata* induce abnormal stimulation that procures an evacuation, but through resultant irritation to the mucosa and stretching or displacement of the bowel, their later effects are responsible for inactivity of the colon and rectum, which necessitates constantly increasing doses or larger injections.

In the majority of instances the author attempts a cure with moral, dietetic, physical, and other measures, and resorts to drugs and enemata only when necessary to procure an immediate evacuation or prevent fecal toxemia when healthy evacuations are prevented by invalidism, hepatic affections, paralysis, intestinal, or rectal lesions that interfere with satisfactory evacuations.

Prophylactic Treatment.—Constipation is usually acquired and in many instances could have been avoided had the subject been instructed as to hygienic care of the bowel. If education along that line is begun in early childhood and practised through life, as it should be, a great deal of suffering would be avoided, many lives saved, and thousands of miserable people made happy.

Costiveness in infants and children can ordinarily be prevented by having the mother avoid indiscretions in diet, drink, and social indulgence during lactation, and later see that the child drinks sufficient water, consumes suitable amounts of properly balanced milk and non-constipating food, eats at stipulated hours, endeavors to secure evacuations at regular hours, and spends considerable time playing in the open air.

While definite rules cannot be laid down to prevent constipation and to help individuals so afflicted, the following suggestions will prove helpful to some and curative to other patients if followed for a sufficient time: (*a*) avoid gourmandizing and excessive drinking of alcoholics; (*b*) live in well-ventilated rooms; (*c*) indulge in in-door and out-door sports and exercise; (*d*) obtain sufficient sleep; (*e*) have meals at a fixed time; (*f*) masticate thoroughly; (*g*) consume food that leaves sufficient residue to stimulate the bowel; (*h*) respond promptly when there is a desire to stool; (*i*) endeavor to procure an evacuation at the same hour daily; (*j*) refrain from indiscriminate use of drugs and enemata; (*k*) use a conveniently located toilet that is comfortable and has a seat (Figs. 811, 812) that is of a proper shape and height; (*l*) concentrate the mind upon the act of defecation and avoid reading while at

stool; (*m*) do not postpone an evacuation when in public places because of false modesty, when at school, or because it interferes with work or social engagements; (*n*) drink abundantly of water, eat sufficient fruit, and discontinue tight lacing and too high heels.

Physicians need educating as to the value of bowel hygiene and the evil results that follow the indiscriminate prescribing of drugs and enemata which are more liable to aggravate constipation that might otherwise have been cured by more effective and less harmful measures.

Moral Treatment.—Constipated subjects are often depressed and frequently respond to *psychotherapy* when properly handled in a cheerful, encouraging, business-like manner, and are told their constipation will improve or disappear if they follow the plan of treatment suggested.

Dietetic Treatment.—The importance of dietetic treatment in all forms of *constipation* has been underestimated, but it is not curative in *obstipation*. Foods are changed from time to time according to results or complication of disease, and a dominating vegetable diet—rich in cellulose residue—reinforced by a small percentage of eggs, meat, and easily digested food, some fat, liberal amount of water, and stewed or raw fruit is of great assistance in procuring regular normal evacuations. Arbitrary time schedules and food lists are impracticable and must be modified to meet individual requirements.

Laxative foods—water, cereals, sweets—syrops, honey, etc.—apples, prunes and figs, butter, bacon, salad oils, celery, corn, spinach, potatoes, string beans, and other vegetables leaving a coarse residue—are the types of food indicated for the constipated subject, since contained organic acids, salts, sugar, and fats tend to soften the feces and lubricate the bowel, and the vegetables through their bulk and roughness stimulate peristalsis and the secretion of mucus.

Dry coarse foods and indigestible substances—agar-agar, seeds, and liquefied celluloses—are contraindicated in tuberculous, nephritic, or cardiac cases aggravated by gas accumulations; a coarse diet is discontinued when it produces disturbing gastro-intestinal manifestations, but is effective as a curative measure in *membranous colitis* inducing spastic constipation.

Patients must not expect immediate results, but gradual improvement of their constipated state.

The author has elsewhere¹ listed foods *permitted* and those

¹ Constipation, Obstipation, and Intestinal Stasis, pp. 215-217, 1916.

prohibited in the treatment of constipation, to which the reader is referred.

Physical measures are prophylactic, can be relied upon to relieve and cure many cases of constipation, and take preference over drugs and enemata when feasible.

The following comprise the chief *physiotherapeutic* measures employed in the treatment of chronic atonic constipation used separately or in combination: *exercise, bodily movements, hydrotherapy, massage, vibration, electricity, inflation, dilatation, and tamponing.*

Exercise.—Habitual indulgence in out-door and in-door sports, exercise and gymnastics such as calisthenics, fencing, boxing, wrestling, bowling, basketball, walking, golf, horse-back riding, driving, rowing, swimming, bicycling, tennis, cricket, football, running, jumping, hand-ball and baseball, markedly benefit the constipated subject afflicted with intestinal auto-intoxication, because they improve his general, mental, and physical condition, aid digestion, absorption and elimination, increase muscular tone and glandular secretion, thereby helping to restore functioning power of the abdominal muscles, colon, and rectum.

Exercise is helpful because it strengthens heart action, stimulates the circulation, and deepens inspiration, bodily oxygenation, and flow of bile.

Out-door exercise and games with cheerful companions and amid pleasant surroundings are more effective than in-door exercise in dark, poorly ventilated quarters when the subject stops before he is overworked to prevent the evil results of exhaustion and non-elimination of toxins, and when exercise is practised daily instead of occasionally.

Bodily Movements.—The following bodily exercises employed by the author alone or in conjunction with the *army regulation set-up exercises* have proved effective for preventing and relieving constipation in many cases:

1. Stand erect with legs together and slowly bend the upper part of the body to the left as far as possible, and then to the right in the same manner (Fig. 816).

2. Assume the erect posture and rotate or turn the body upon the hips.

3. Take same position and, without bending knees, lean forward and downward until tips of fingers touch the floor in front of toes (Fig. 817).

4. Lie flat upon a firm bed, table or couch, with the legs held rigidly together, and raise body until it is at or near a right angle to limbs (Fig. 818).

5. Reverse procedure by raising stiffened limbs until they are at a right angle to body.

6. While still in recumbent posture flex knees and draw thighs closely up against abdomen.

7. Kneel upon the floor, and with pelvis fixed, bend body in succession, forward, backward, from side to side, and then rotate it as far as possible in one direction and then the other.

8. Standing erect, with hands crossed behind or extending fully above the head, quickly change to the squatting posture.



Fig. 816.—Stand erect with legs together and slowly bend upper part of body to the left as far as possible, and then to the right in same manner. Repeat.

9. Lean slantingly forward and repeatedly draw up the abdominal muscles and relax, taking deep respirations to exercise diaphragm and abdominal muscles.

10. Extend both arms at a right angle from the body, forming a straight horizontal line, and walk eight times *on tip-toes* from one end of the room to the other.

Practice daily, in succession, and gradually increase the exercise to avoid the discomforts of overexercise.

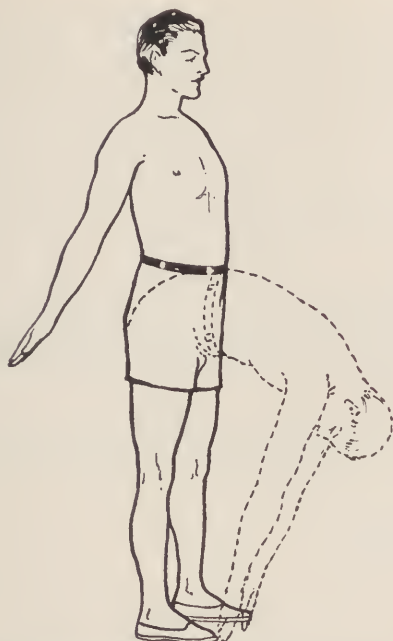


Fig. 817.—Stand erect with legs together and, without bending knees, lean forward and downward until tips of fingers touch the floor in front of toes. Repeat.

Hydrotherapy.—Water in one form or another is a valuable adjunct in treatment of *atonic*, *spastic*, and *obstructive* constipation,

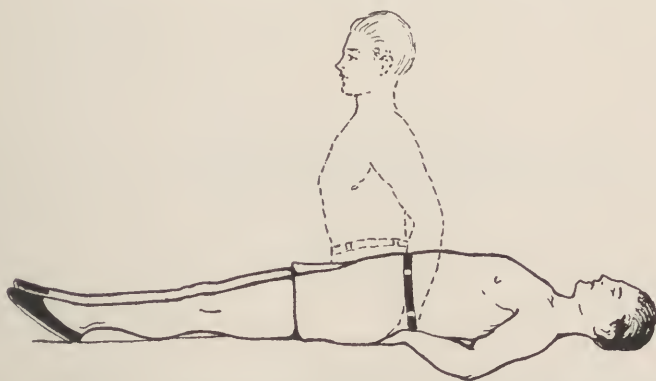


Fig. 818.—Lie flat upon a firm bed, table, couch, or floor with legs held rigidly together, and raise the body until it is at a right angle to limbs. Repeat.

but hydiatic agents are more effective when supplemented by exercise, dieting, and massage, etc.

Beneficent results of hydrotherapy are due more to the *thermal, mechanical, solvent, or gaseous* action of the water and *psychology* of the procedure than to its contained chemical ingredients, contrary to the opinion of many hydrotherapeutists.

No small part of the benefit derived from the treatment of constipation as prescribed at Saratoga, French Lick, Hot Springs, and *so-called cures* at similar foreign *spas* and institutions is due to the discontinuance of business and social duties, change of climate and scenery, modified diet, open-air exercises, divertisement, and psychic influence of their surroundings.

Mineral water containing magnesium, sodium, and potassium salts are *laxative*, but not *curative*, while those possessing an excess of lime are *constipating*—unless boiled; pure water used for drinking and bathing purposes is more effective when drunk in suitable quantities, at the right temperature, and is intelligently used in the form of a bath, douche, compress, or enema. Hydriatic measures may be *internal* or *external*.

Internal hydrotherapy embraces water drinking, enteroclysis, and enemata.

Water Drinking.—Water taken at appropriate times, in reasonable amounts, at a suitable temperature frequently alleviates or cures constipation, but indiscriminate water drinking may be harmful. Water must not be ingested at a temperature below 50° F. or above 120° F., nor more than 5 to 10 glasses should be consumed daily, and results are better when taken frequently in small rather than in large quantities.

The habit of drinking several glasses of ice-water at meals is pernicious, leads to indigestion, gastric dilatation, and constipation or diarrhea. Cool water (65° F.) in liberal quantity taken on arising and at intervals during the day restores *tone* to the atonic bowel, while warm water (110° F.) is soothing and indicated in the presence of enterospasm and rectocolonic pain and irritability.

Copious water drinking favors solution, assimilation, and the elimination of toxins, clears the bowel of fermenting and putrefying food, increases the blood column, softens feces, and encourages free, painless movements.

Enteroclysis and Enemata.—These procedures are valuable adjuncts to the treatment of constipation complicated by recurring fecal impaction and marked auto-intoxication.

Rectocolonic irrigation—lavage—alone or reinforced by an electric current, using a Kemp irrigator (Fig. 819), tends to increase peristalsis and secretion of mucus when employed cool, and alleviates pain, cramps, and hypersensibility if hot (110° to 120° F.). En-

teroclysis with water or medicated solution is practised in constipated individuals suffering from coloproctitis, retained discharges, decayed food remnants, inflammation and ulceration of the mucosa, and to strengthen cardiac action, prevent the formation of scybalæ, and stimulate emunctories. To be effective irrigations must reach all segments of the atonic, ballooned, or obstructed bowel, and the fluid or water must be of a suitable temperature and lavage continued until the gut has been freed of its offending content, which

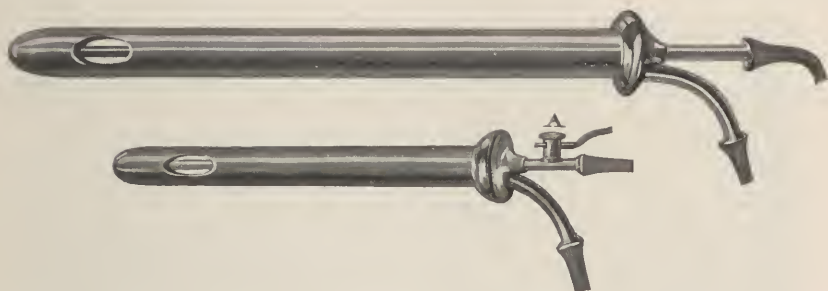


Fig. 819.—Irrigator employed in the treatment of constipation, high rectal and sigmoidal strictures, ulceration, and coloproctitis: *A* shows attachment for electro-enteroclysis.

is facilitated by placing the patient in a suitable posture—inverted, dorsal, Sims', or knee-chest—and using a proper syringe or irrigating apparatus.

It is impossible in the average case to introduce a rubber pipe above the lower sigmoid, because it curls up in the rectum or sigmoid, hence long colon tubes are not reliable for administration of high irrigations or enemata; the tube may often be inserted farther if the flow distends the gut ahead of the introduction.

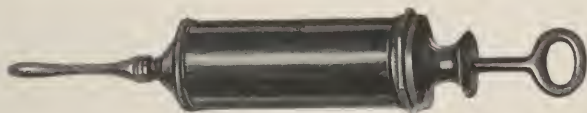


Fig. 820.—Hard-rubber piston syringe useful for administering *low* enemata.

Enemata—clysters—are designated *high* when introduced into the sigmoid flexure, colon, and cecum, and *low* when water is projected into the rectum only. Clysters are employed to stimulate peristalsis with a resultant desire to stool, to soften and break up putty-like or hardened feces, and procure an immediate evacuation, particularly in constipation complicated by coprostasis.

Frequent *cold* enemata are occasionally used to *tone* up a ballooned or atonic rectum, and *hot* injections to relieve spastic

constipation and spasms of the sphincter and levator ani muscles incited by fissures, hemorrhoids, tumors, inflammatory or ulcerative pruritus, and other anorectal lesions.

Large, high injections are contraindicated and harmful if persisted in because they often induce pain, colonic ptosis, deficient peristalsis, or *paresis* owing to weight of the water and impairing of intestinal nerve mechanism and musculature through repeated stretching of the gut. Ordinarily from $\frac{1}{2}$ to 1 pint clears the rec-



Fig. 821.—Spinal douche which through action upon nerves stimulates enterocolonic activity.

tum, 1 quart, the sigmoid, and a 2- to 3-quart enema satisfactorily evacuates feces retained in the upper colon or cecum. Quicker and better results are obtained with copious oil, \mathfrak{z} viii (240.0), or soapsuds injections plus inspissated oxgall, \mathfrak{z} j to iv (30.0–120.0), than plain water, since they lubricate and dissolve impacted masses in the bowel, but they excite burning pain or tenesmus when the bowel is inflamed or ulcerated.

Hydrogen dioxid injections (25 to 50 per cent.) should precede

the above in obstinate cases of impaction because they break up hardened feces through oxygen and chemical action. Position of the patient should be changed and the colon massaged that the enema may be made to reach all segments of the large intestine.

Except when employed for a specific purpose, cold water is contraindicated, since it incites enterospasm, which arrests its upward flow. The indications for, paraphernalia required, and technic employed in the administration of *irrigations* and *enemata* having been fully described and illustrated elsewhere,¹ their further discussion is unnecessary here.

External Hydrotherapy.—Baths, rubs, douches (Figs. 821, 822), compresses, and packs are the chief hydriatic procedures employed



Fig. 822.—Method of applying hot fomentations in cases of spastic constipation—enterospasm.

in constipation, comprising to make external as useful as *internal hydrotherapy* in this class of cases.

Fresh, salt, and effervescing waters applied in the above manner at a suitable temperature are indicated in different cases. *Hot* and *warm* (105° to 110° F.) treatments are preferable for *spastic* and *mechanical*, and cold water (65° to 70° F.) baths, douches, etc., are more effective in *atonic constipation*, since the *former* relieves irritation and muscular spasm, and the *latter* exhilarates the patient, sharpens mental faculties, diminishes insomnia, and *tones* up the general system and intestinal musculature. External hydrotherapy

¹ Gant, Constipation, Obstipation, and Intestinal Stasis, 2d ed., 1910.

also frees the body of impurities consequent on perspiration, opens skin glands, increases absorption of oxygen and escape of carbonic acid, and lessens intestinal *auto-intoxication* through the discharge of toxins resulting from stimulation of the skin, kidneys, liver, and intestine.

Reaction from hydiatic treatments is modified by temperature of the water, power with which it is thrown against the body, rapidly alternating very hot and cold douches, and using salt, iron, pine-needle extract, mustard, or turpentine in connection with immersion baths;



Fig. 823.—Sitz-bath used to relieve constipation, pain, and sphincteralgia incident to inflamed or strangulated hemorrhoids when water is employed hot (105° to 120° F.). Cold (55° to 65° F.) or neutral (92° to 98° F.) sitz-baths are helpful in atonic constipation with ballooning of the rectum.

effect of the treatment is also enhanced by salt or oil rubs, friction of the skin or deep *massage* of the abdomen during or immediately following treatments.

Cold plunge and immersion are employed for their tonic action, and *hot* sweating for intestinal irritability, soreness, and enterospasm, and *sitz*-baths for constipation complicated by sphincteric spasms, strangulated hemorrhoids, and painful defecation.

Douches are effective in suitable cases when applied under high pressure, at an even or alternating temperature, particularly

when the spinal, abdominal, or perianal region is massaged during their application.

Hot and cold compresses or girdle placed about the abdomen (Fig. 822) or over the anus are comforting and beneficial in cases of spastic and atonic constipation, when temperature of the water is regulated to meet the individual case, since heat is relaxing and cold stimulating to the inactive bowel.



Fig. 824.—Alternating hot and cold abdominal Scotch douche, using the water under high pressure.

Massage alone or in connection with other physical measures is invaluable for *atonic*, but is often contraindicated in the treatment of *spastic constipation* and *obstipation* except when there are fecal masses to be broken up, and results are better when practised daily for several weeks. Strength of manipulations is gradually increased to avoid soreness and nervousness; massage is most effective when limited to the cecum, ascending colon, sigmoid flexure, and colon.

Massage may be employed in the form of *effleurage*, which is

soothing because of the long, soft strokes, and *pétrissage*, better known as deep pressure massage (Fig. 826) with kneading.

Friction—light—or circular manipulation of an organ made by thumb, fingers, or fist, and *tapotement*, which consists in stimulating the intestine by rapid strokes of fingers or the edge of the hand, are also useful.

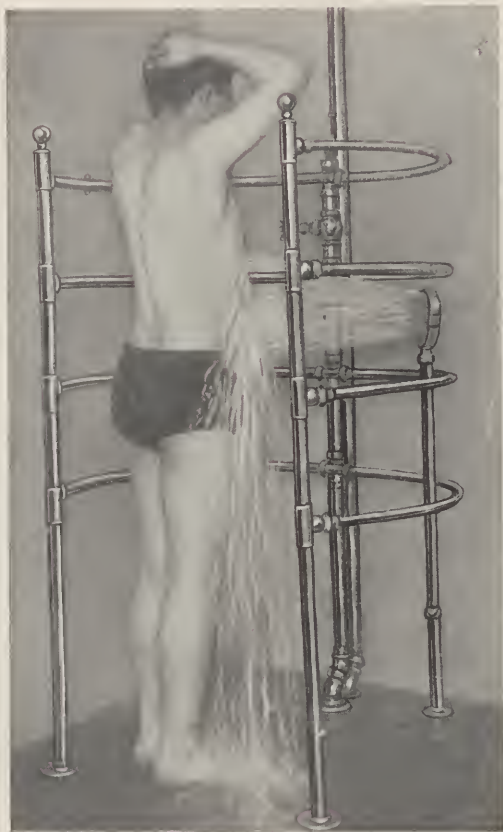


Fig. 825.—Abdominal and liver douche valuable in treatment of chronic atonic constipation.

Treatments are conveniently carried out with patient in the dorsal position, with knees flexed, on a table of suitable height, and are more effective when individual colonic segments are massaged in turn, attention being paid to the liver when necessary (Fig. 827).

Massage strengthens abdominal and intestinal musculature (Fig. 827), increases glandular secretion, quiets neurogenic disturbances, augments absorption, assimilation, oxygenation through



Fig. 826.—Technic of pétrissage—deep pressure massage.

action upon the circulation, relieves auto-intoxication through the emunctories, breaks up adhesions, dislodges fecal masses down-



Fig. 827.—Technic of deep rotating colonic massage.

ward, encourages the patient, and lessens headache and depression. Efficiency of massage is increased by other physical therapeutic

measures. Contraindications to massage are: menstruation, pregnancy, aneurysm, gastro-intestinal ulcers, and hypersensitiveness.

Vibration.—Mechanical vibration with a suitable vibrator (Figs. 829, 830) is helpful because it strengthens the propulsive power of the colon and rectum when the vibrator is applied over the abdomen or in the rectum, and treatments have a sedative, stimulative, or inhibitive action when directed against local or



Fig. 828.—Technic of treating abdominal muscles and atonic colon with vibrator.

spinal nerve centers, using mild for soothing, and stronger vibrations when peristaltic contractions are to be augmented. Since the physiologic action of vibration is similar to that of massage, further discussion of its action is unnecessary (Fig. 832).

In obstinate cases machines that massage (Fig. 828), roll, or shake the abdomen, stomach, and colon—*vibratomasseur*, *Zander horse* (Fig. 834), *abdominal roller* (Fig. 833), and *Nile's normalizer*

—tend to strengthen the viscera and enhance intestinal secretion, break up fecal accumulations, and stimulate normal evacuations.

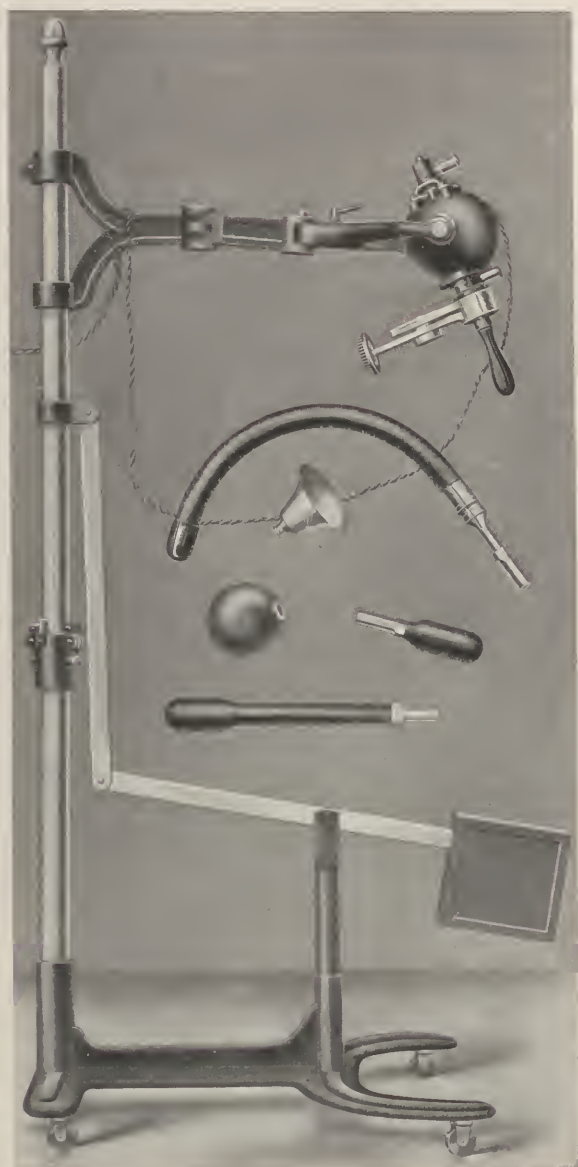


Fig. 829.—Chattanooga vibrator and vibratodes.

Electricity.—While electricity does not accomplish what the average electrotherapeutist claims, it is of value in *atonic*, *spastic*,

and *mechanical* constipation applied at reasonable intervals for a sufficient time, when employed in connection with dieting, water-drinking, exercise, and physiotherapy to improve the general condition and augment the propulsive and secretory functions of the colon and rectum.

Electric applications appeal to the despondent, constipated subject, but when an unsuitable current is employed and treatments are given too long or frequently, increased nervousness or despondency, insomnia, abdominal soreness, or unfavorable reac-



Fig. 830.—Sheldon portable vibrator.

tion may ensue. Electricity is often contraindicated in the very old or young, is not used on patients having an antipathy to it, and different currents are tried until the one meeting indications has been found.

Electric applications may be made to the abdominal skin, inside the rectum, or both, and the electrodes placed near or distant to each other, preferably after being moistened; *general electrization* is indicated for debilitated and nervous individuals, but when the patient is treated for ordinary constipation applications are

directed to the stomach, liver, small intestine, colon, and rectum by applying the current to the spine, over the abdomen, and in the empty or water-filled bowel, which serves to tone up nerves, blood-vessels, and musculature, stimulate secretion, and enhance absorption and elimination.

The *faradic*, *sinusoidal*, *galvanofaradic*, *galvanic*, *static*, and *high-frequency* currents alone or in conjunction have been employed with success in constipation and auto-intoxication.

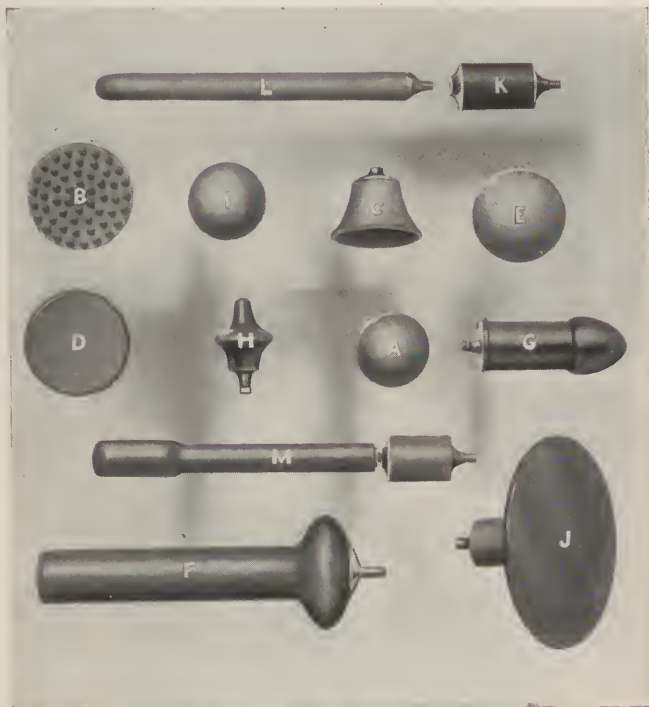


Fig. 831.—Types of vibratodes, of which *F*, *G*, *H*, and *L* are suitable for treating ano-rectal stricture and hypertrophy of the sphincter and levator ani muscles causing constipation or difficult defecation.

The *faradic*, which is effective owing to frequent *interruptions* in the current, is easily applied and more useful when the *negative* metallic or irritating electrode is retained in the rectum, while the *cathode* is applied to the back or, preferably, is in turn placed over different colonic segments and the liver.

Filling the colon with water or saline solution conducts the current higher and soothes the gut if irritable, and tones intestinal musculature when atonic.

The *sinusoidal* current in addition to its tonic action relieves



Fig. 832.—Method of making vibratory treatments to the spine in atonic constipation.

flatulence, soreness, pain, and enterospasm independently or when employed with massage and hydrotherapy.

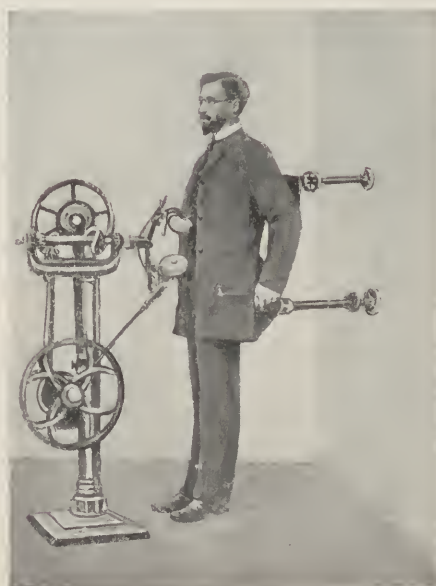


Fig. 833.—Rotary wheel massage which strengthens the colon and abdominal muscles.

Galvanofaradic electricity strengthens abdominal and intestinal musculature through the faradic and soothes the bowel with the galvanic current; the double action makes it suitable for all forms of costiveness.

Galvanic electricity is a widely used and effective therapeutic measure when amperage is carefully watched, and the continuous and interrupted current is varied—being gradually increased; a broad electric pad is placed over the abdomen and a metallic electrode is introduced into the water-filled colon.

Static electricity—spark, bath, breeze, friction—applied to the skin or within the bowel is impressive and of assistance in



Fig. 834.—Zander horse exercising machine.

building up debilitated subjects, making the colon and rectum functionate more effectively; the high-frequency current, however produced, similarly employed, is useful in the same class of cases.

Electrohydrotherapy in the form of baths and irrigations (Fig. 819) is a valuable adjunct in the treatment owing to the tonic effect of the current.

Colonic oxygen baths (Fig. 839) are stimulating and help the patient to recover more quickly from auto-intoxication.

The galvanic, faradic, sinusoidal, and galvanofaradic currents in connection with hydrotherapy have frequently benefited neuras-

thenic, anemic, and constipated individuals afflicted with hepatic and cardiac affections.

Other Physical Therapeutic Procedures.—*Instrumentation.*—Where proctoscopes, bougies, rectal and anal dilators of various sizes (Fig. 923) are repeatedly introduced and left in the bowel

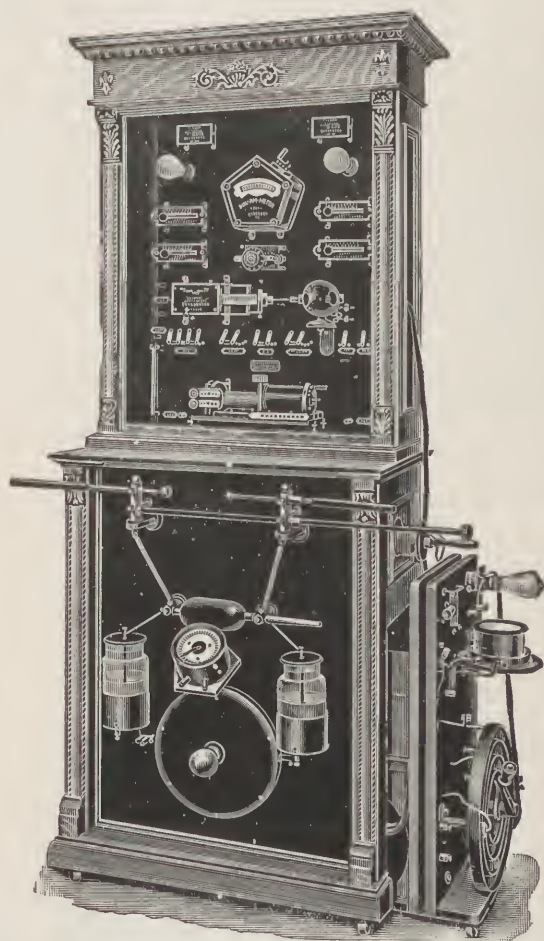


Fig. 835.—Author's electric cabinet combining the galvanic, faradic, high-frequency, and sinusoidal currents useful in different types of constipation.

for a definite time, are manipulated from side to side, encourage more frequent and normal evacuations by stimulating peristalsis, stretching the sphincter, and widening the anal canal; but such treatments are carried out by the physician. Rectal vibratory massage practised using a bougie (Fig. 831, *M*) attached to a

vibrator accomplishes the same result and reduces prostatic enlargement.

Inflation of the rectum with a Gant (Fig. 840), Barnes', or Hirschmann (Fig. 924) bag compressed air tank and tube stimu-

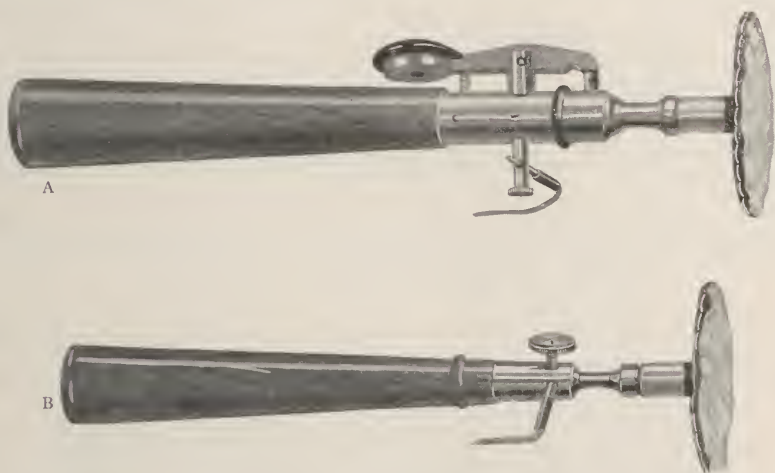


Fig. 836.—A, Electrode with interruptor for galvanic, faradic, and sinusoidal currents B, ordinary (continuous) electrode used for different currents.

lates the atonic, ballooned bowel, but pressure must be controlled to prevent pain and rupture of the gut.

Constipation due to contraction at the rectosigmoidal juncture may be relieved by introducing the dilating bag (Fig. 840) through

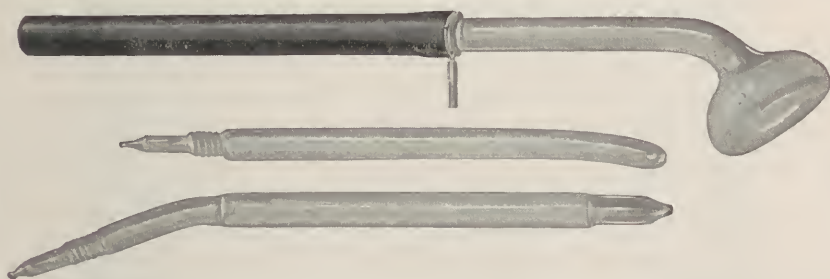


Fig. 837.—Glass sinusoidal (high-frequency) electrodes employed in the palliative treatment of piles to allay pain, irritation, or sphincter algia inducing constipation.

a sigmoidoscope (Fig. 840, B), which is inflated following removal of the instrument.

Rectal tamponing suggested by MacMillen sometimes augments peristalsis and produces a desire for an evacuation, but

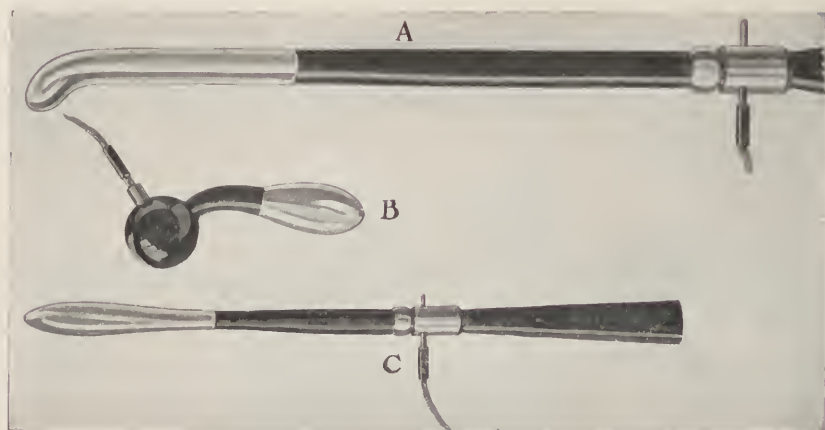


Fig. 838.—Electrodes: *A*, Colonic; *B*, anal; *C*, rectal.

the procedure is impractical because tampons are painful and irritate hemorrhoids, ulcers, fissures, and other anorectal affections.



Fig. 839.—Intestinal oxygen bath helpful in chronic atonic constipation complicated by anemia.

Medicinal Treatment.—Education as to the manner of living and formation of regular habits as to eating and emptying the

bowel, psychotherapy, exercise, dieting, hydrotherapy, massage, vibration, and electricity alone or in conjunction are given *precedence* over the *medicinal* treatment of constipation whenever feasible; because results from drugs are more often *temporary* than permanent in *chronic*, but are indicated in *acute* and *spastic* constipation owing to their tendency to procure prompt evacuations.

Medical treatment of habitual constipation is justly unpopular, since it is seldom curative, dosage must be continually increased or a new drug substituted; purging interferes with digestion and induces distressing manifestations or colitis; some cathartics possess

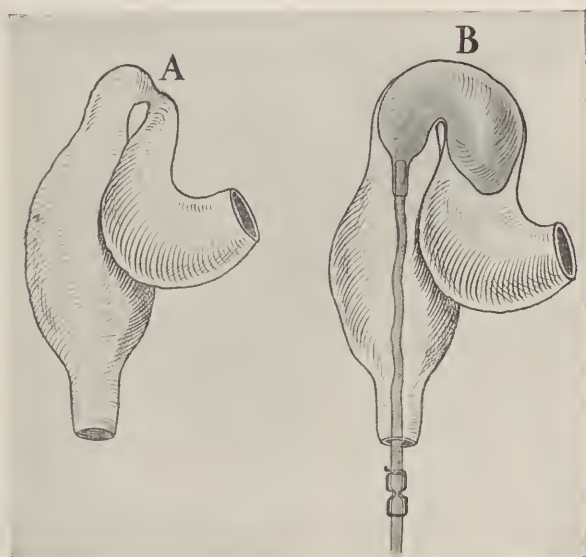


Fig. 840.—Divulsing a stricture at O'Beirne's sphincter *A*, with *B*, the author's modified Barnes' bag.

a secondary constipating effect or induce an undesirable number of stools. Physicians of experience have learned peristalsis, glandular secretion, and more natural evacuations can be procured with aid of the physical therapeutic procedures described.

Drugs are justified in the treatment of constipated subjects when delayed or incomplete movements are a symptom of another disease, to obtain immediate relief from auto-intoxication due to retained food remnants and impacted feces, procure fluid or soft evacuations when there is obstruction in the small intestine, colon, or rectum, prepare the patient for operation, prevent postoperative flatus, toxemia, and coprostasis, empty the bowel of old, debilitated,

insane, and paretic patients, lubricate the gut, soften feces and forestall postdefecatory pain incident to hemorrhoids, fissure, and sphincter-algia, temporarily relieve chronic constipation in patients who cannot afford the time and expense needful to a *cure*, and procure daily evacuations for persons disinclined to undergo an operation or prolonged treatment.

The *indiscriminate prescribing of drugs does more harm than good*, and to obtain best results etiology of constipation must be considered and a drug selected that will procure satisfactory evacuations with minimum discomfort, and which tends to restore bowel function as it is gradually reduced in dosage and frequency.

Drugs differ in their manner of relieving constipation and vary in their action from mild laxatives to strong purgatives.

Laxatives, such as *cascara sagrada*—*rhamnus purshiana*—extract, gr. iv (0.25); fluidextract, ℥xv (1.0); aromatic, ℥ss to ij (2.0–8.0); regulin, ℥j to ij (4.0–8.0); purgatin and exodin, gr. x (0.6). *Aloe*, extract, gr. ij (0.13); tincture, ℥xxx (2.0); Pil., i to v. *Senna*, compound tincture, ℥ij to iv (8.0–16.0); syrup, ℥ss to ij (2.0–8.0); infusion, ℥ss to j (2.0–4.0); *Pulvis glycyrrhizæ compositus*—licorice powder—℥j to ij (4.0–8.0). *Rhubarb*, extract, gr. iv (6.0); fluidextract, ℥xv (1.0); aromatic, ℥j to ij (4.0–8.0), are effective.

Hydragogues.—Saline cathartics—sodium sulphate—Glauber's salt, ℥ss to ℥j (2.0–4.0); magnesium sulphate—Epsom salt, ℥ss to ℥ij (2.0–8.0); potassium bitartrate—cream of tartar, gr. xv to lx (1.0–2.6); potassium and sodium tartrate—Rochelle salt, ℥vj to xij (24.0–48.0); magnesium citrate, ℥vj to xij (24.0–48.0), and mineral waters are helpful in some cases.

Purgatives.—*Podophyllin*: Rosin, gr. $\frac{1}{2}$ to ss (0.005–2.0); fluidextract, ℥v to xv (0.3–1.0); tincture, ℥v to xv (0.3–1.0). *Colocynth*: Extract, gr. ss (2.0); pill—compound cathartic. *Jalap*: Extract, gr. ij to viij (0.13–0.5); tincture, ℥ss to j (2.0–4.0); castor oil—oleum ricini, ℥ss to ℥j (15.0–30.0); calomel, gr. ss to v (0.03–0.3), are more frequently employed in *acute* constipation.

Oils.—The administration of vegetable—olive, sweet almond, or cotton seed—oil promotes copious and regular stools through softening feces, increasing flow of bile, lubricating the bowel and stimulating peristalsis, and helps build up the system when absorbed; the contained *volatile fatty acids* and *glycerin* are broken off by bacterial action and fat-splitting enzymes, both of which stimulate intestinal motility; but these enzymotic agents have no effect on *mineral oils*—petroleum—that break up and lubricate hardened feces and make the bowel more slippery, and are not absorbed, but excreted as ingested.

In different cases oils are administered once daily, or morning and night, in doses varying from \mathfrak{zss} to ij (15.0–60.0) until oil begins *dribbling through the anus*, when dosage is diminished or temporarily discontinued. When effective a cure is gradually accomplished without causing serious digestive disturbances or producing an inflamed mucosa.

Laxatives are popular in atonic constipation since they are less irritant and tend to produce satisfactory stools without incapacitating the patient. Unlike laxatives, which stimulate peristalsis and glandular activity, *saline cathartics* procure evacuations by withdrawing fluid from the system, increasing fluidity and bulk of the feces with resultant peristalsis and easy stools.

Drastic purgatives, through irritation and transudation, incite multiple fluid movements accompanied by griping pain, but leave the mucosa inflamed and irritable, hence they are contraindicated except in constipation complicated by fecal impaction, putrefaction, or acute auto-intoxication.

Dinner or laxative vegetable pills are easy to take, bring about soft, daily movements, and are *curative* in some instances when given in the following or similar combinations:

R̄.	Aloini.....	gr. iij	0|2;
	Strychninæ sulphatis.....	gr. $\frac{1}{2}$	0|02;
	Ext. belladonnæ.....	gr. ij	0|1.
Misce et fiat massa div. in pilulæ xx.			
Sig.—One pill at bedtime.			

R̄.	Resinæ podophylli.....	gr. v	0|3;
	Ext. physostigmatis.....	gr. $\frac{1}{2}$	0|5.
	Ext. nucis vomicæ.....	āā gr. viiss	0|5.
Misce et fiat cum ext. et pulv. q. s. in pilulæ xxx.			
Sig.—One pill twice daily.			

R̄.	Ext. rhamni purshianæ.....	\mathfrak{zss}	2|0;
	Ext. nucis vomicæ.....	gr. iv	0|2;
	Ext. physostigmatis.....	gr. iij	0|2;
	Ext. belladonnæ.....	gr. ij	0|1.
Misce et fiat massa div. in pilulæ xx.			
Sig.—One pill at night or night and morning.			

The following prescriptions have proved efficacious in the treatment of constipated children prescribed in dosage and frequency according to age:

R̄.	Syrupi rhei aromat.....	\mathfrak{zss}	15|00;
	Ext. fl. rhamni purshianæ.....	$\mathfrak{z}iij$	12|00;
	Glycerini.....	q. s. ad. $\mathfrak{z}ij$	60|00.—M.
Sig.—One teaspoonful daily for a child three to five years of age.			

R̄.	Ext. belladonnæ.....	gr. $\frac{1}{4}$	0|075;
	Pil. aloes et myrrhæ.....	gr. ix	0|6;
	Olei carvi.....	gtt. ij	0|12.
Misce et fiat massa div. in pilulæ vj.			
Sig.—One pill at bedtime for a child aged six.			

An exhaustive study of *drugs* and *formulæ* employed in the treatment of different types of constipation has been given in Chapters XXVI and XXVII of the author's work on Constipation, Obstipation, and Intestinal Stasis, 1916.¹

SPASTIC CONSTIPATION

Delayed or incomplete evacuation the result of *enterospasm* is more common than suspected, and is frequently a postoperative sequel to gastro-intestinal operations. This condition is characterized by simultaneous contraction of circular and longitudinal muscle-fibers that involve and partially or completely occlude a short or considerable segment of small or large intestine. Spasmodic contractions may last from a few moments to days, causing slight or marked constipation or intestinal obstruction, during which time the gut feels narrow and rigid.

Spastic constipation may be induced by reflex disturbances, irritating feces, digestive disorders, foreign bodies, and inflamed or ulcerated mucosa—coloproctitis—has complicated hysteria, tabes dorsalis, bacillary meningitis, and other grave nerve affections, and resulted from irritation or obstruction induced by lumbricoid and tapeworms and other parasites.

Myxorrhœa coli, characterized by *mucous discharges* in the form of thickened strips or casts, *colic*, and marked neurogenic disturbances, is a common cause of spastic constipation. Enterospasm is also an occasional manifestation of suppurative disease and different types of chronic intestinal obstruction complicated by fecal impaction and gas accumulation.

Hypertrophy of the levator ani and sphincter from irritable anorectal disease may be accompanied by spastic or tonic contraction of these muscles which causes painful defecation and retarded evacuations, a condition sometimes diagnosed as spastic rectal constipation.

Symptoms.—The chief *manifestations* of *spastic* constipation—enterospasm—are colic, localized soreness, tympanites, coprostasis, and when severe, usual manifestations of intestinal obstruction, and when due to irritability or hypertrophy of the anorectal muscles feces are evacuated frequently in short-pointed pieces—*fragmentary* constipation.

The **diagnosis** is confusing and the condition may be mistaken for chronic obstructive lesions unless the attendant resorts to fluoroscopy and notes improvement accomplished through the application of measures that cause relaxation of intestinal musculature.

¹ Published by W. B. Saunders Co.

Treatment.—The treatment of spastic constipation is *medical* in some and surgical in other cases, depending on the causation, degree, and duration of enterospasm.

In *atonic*, one endeavors to stimulate peristaltic contractions, while in *spastic* constipation the object is to prevent them and cause relaxation of intestinal musculature, hence strong laxatives and purgatives are *contraindicated*, since they stimulate bowel motility and irritate the mucosa.

Ordinarily satisfactory movements are obtained and manifestations of obstruction relieved through continuous application of dry or moist heat to the abdomen, hot saline or oil enemata, warm soups, hot water drinking, and administration of belladonna—tincture, ℥v to xx (0.3–1.3), extract, gr. $\frac{1}{4}$ (0.016), by mouth or in suppositories t. i. d., reinforced by morphin, gr. $\frac{1}{8}$ (0.008), or hyoscyamus, gr. $\frac{1}{4}$ (0.016), when complicated by colic, agents tending to relieve intestinal irritability and muscular spasms responsible for delayed evacuations.

Occasionally obstinate enterospasm at the rectosigmoidal juncture is instantly relieved by extracting tenacious strings of mucus through the proctoscope with swab or forceps; when constipation is induced by spasmodic contraction of the levator ani or sphincter muscle costiveness is overcome by suppositories and sedative applications made to sensitive lesions causing irritation and divulsing or splitting the anal canal.

Spastic constipation resulting from myxorrhœa coli—membranous colitis—is benefited by a *coarse*—cellulose—diet which increases the fecal bulk, stimulates peristalsis, and causes freer evacuations, but results are better when dietetic treatment is reinforced by belladonna, heat, and measures that lessen intestinal irritability.

PSYCHIC CONSTIPATION

To illustrate the power of mind over the gastro-intestinal tract it is only necessary to recall that fright and mental anxiety, like the first night of a play, delivering an oration before a strange audience, taking an examination, or living under a great strain may be sufficient to cause semisolid, loose, or involuntary stools, and anger, excessive joy, grief, and worry may produce a reverse effect by inducing constipation.

By concentration one may train himself to awaken at a given hour, and the mind properly directed under favorable circumstances influences the bowel so that an individual has a desire to stool at the same time daily, or have more than one evacuation in twenty-four hours. Patients have been relieved of constipation without

being aware of it by Christian Scientists and physicians who have treated them by *suggestion*, prescribing measures that could not affect the intestine except through mental processes, which demonstrates the psychic origin of the infrequent or incomplete evacuations.

Except from a nervous or emotional angle the **symptoms** of *psychic* differ but slightly from those of *atonic* constipation, and the **diagnosis** is likewise similar, save it is essential to ascertain the factor behind the mental disturbance responsible for the trouble.

When **treating** *psychic* or *pseudoconstipation*—where the patient, without reason, believes evacuations are incomplete and retained feces are poisoning him—the physician should maintain a cheerful air, business-like manner and confident attitude, and encourage the patient to believe he will certainly be cured if he follows the suggestions and treatment prescribed, and exercises in the open air amid pleasant surroundings.

Each case must receive individual consideration, and since *psychotherapy* is based on *faith*, one must so carry out the treatment that the subject does not realize he is being treated *psychically*, but may be allowed to think that certain therapeutic agents, massage, electricity, etc., employed benefit him locally, though they really factor through the mind.

Undoubtedly *motor* and *vasomotor* nerves and the endocrines are influenced by the suggestion of a magnetic physician, so that constipation is relieved or improved through augmentation of peristalsis and glandular secretion. *Moral suasion* should be supported by improved hygienic surroundings and other therapeutic measures where *psychic* constipation is associated with other diseases.

Chapter LXXXVIII

Obstipation—Intestinal Obstruction—and Intestinal Stasis— Auto-intoxication

Obstipation, formerly regarded as *intractable* costiveness, ought to be interpreted in a broader sense, and the author employs the term to indicate the type of constipation induced by *mechanical defects*, causing acute or chronic bowel blocking—stasis—fecal retention, and infrequent stools. With this understanding costiveness may be classified as *constipation—atonic-medical—and obstipation—mechanical-surgical—constipation*. This classification does not include acute obstruction resulting from peritonitis, etc., where intestinal musculature is paralyzed, failing to overcome resistance offered to propulsion of feces—*dynamic obstruction*—a rare condition frequently impossible to differentiate from true or mechanical obstruction.

Obstipation may be *acute* or *chronic*.

ACUTE OBSTIPATION—ACUTE INTESTINAL OBSTRUCTION

Acute obstipation (see Acute Constipation, p. 176) may occur in any segment of gut, is encountered at all ages, characterized by dangerous obstructive manifestations, and met with less often than chronic obstipation—except in children suffering from congenital anorectal anomalies. The acute condition may arise suddenly without warning or become an urgent factor in patients suffering from chronic bowel lesions complicated by stasis.

Acute intestinal obstruction is given full consideration in surgical works, and because of this and the author's desire to emphasize the importance of *chronic obstipation complicated by stasis and auto-intoxication* the subject has been briefly discussed in this volume.

Etiology.—Acute obstipation may be induced by adhesions, kinks, volvulus, intussusception, mesenteric torsion, embolus or thrombosis, benign or malignant neoplasms, Meckel's diverticulum, extra-intestinal pressure, hernia, stricture, foreign bodies, diverticula, fecal impaction, or other lesion that almost or completely occludes the intestine from within or without.

Symptoms.—When preceded by *partial* obstruction, digestive disturbances, increasing constipation eventually alternating with diarrhea, localized soreness, pain, gas accumulation, and fecal retention are the chief manifestations.

When obstruction is *complete* or practically so, dangerous symptoms quickly appear and death ensues if obstruction be not promptly relieved. In such cases there is marked tympanites, varying degree of abdominal rigidity, facial anxiety and pallor, shallow respirations, rapid irregular pulse, maybe sudden rise in temperature, absence of evacuations, nausea, fecal vomiting, cyanosis, restlessness, hyperperistalsis, the patient complains of difficulty in breathing, localized or general abdominal pain and tightness, cold extremities, and feeling of impending danger and, finally, collapse.

Diagnosis.—Owing to distention and changed topography of the abdomen exact diagnosis is difficult, and one is fortunate in being able to define the obstructed point though unable to determine the nature of the lesion. Due to the danger of delay, fluoroscopic examination and radiographic studies are seldom available, and diagnosis must be based chiefly on the history, ascertaining if the patient previously suffered from digestive disturbances, constipation with recurring fecal impaction, ulcerative enterocolitis, appendicitis, or abdominal or pelvic inflammation; relying on physical signs, closely analyzing symptoms, and examining the bowel through the sigmoidoscope. When in doubt the abdomen is opened and the obstructed bowel is brought up and the nature of the block ascertained.

Treatment.—Surgery is imperative in this class of cases, but during preparation for operation the patient is made more comfortable and symptoms modified by copious warm enemata, gastric lavage, hot abdominal fomentations, morphin and belladonna, gr. $\frac{1}{4}$ (0.016), each to lessen pain and relax muscular rigidity, and resorting to stimulation if indicated.

When the patient is in a state of collapse radical operation—enterectomy and colectomy—are abandoned in favor of drainage, the segment of bowel above the obstruction being sutured to the skin—*enterostomy*, *colostomy*—following which it may be amputated or drained by a tube left *in situ*.

In less urgent cases the obstruction is relieved by dividing adhesions, straightening kinks, correcting other distortions, withdrawing incarcerated bowel from hernial opening, relieving extra-intestinal pressure, and if indicated, providing for through-and-through irrigation by performing *appendicostomy*, *cecostomy*, or Gant's ileocecostomy (Figs. 999, 1019).

When conservative surgery is not sufficient because the involved bowel is gangrenous or malignant, *resection* is imperative.

Entero-anastomosis—short-circuiting—*unilateral* or *bilateral* exclusion reinforced by drainage through the appendix or cecum is often indicated in deplorable inoperable cases of acute constipation—obstipation.

As the technic of different operations required in the treatment of acute is almost identical with that for *chronic obstipation* described elsewhere, further discussion of these procedures will be omitted here.

CHRONIC OBSTIPATION—INTESTINAL OBSTRUCTION—AND INTESTINAL STASIS—AUTO-INTOXICATION¹

General Remarks.—In obstipation evacuations are incomplete or retarded as the result of mechanical interference with passage of feces through the bowel—usually terminal ileum, colon, rectum, or anus—which is blocked by lesions—hereafter enumerated—that press upon, narrow, or occlude the gut, inducing varying degrees of obstruction.

Importance of this condition—mechanical constipation—is neither understood nor appreciated, though of frequent occurrence; it is frequently productive of a long train of insignificant, serious or grave manifestations and end-results, due to retained feces and consequent auto-intoxication.

Intestinal stasis commonly attributed to chronic intestinal obstruction may be associated with either *atonic*—medical—constipation or *obstipation*—mechanical obstruction—surgical constipation; and is characterized by retarded stools or imperfect fecal drainage plus absorption of bacterial and other toxins in quantities greater than the system can eliminate. In consequence, auto-intoxication with its manifold symptoms ensues.

Consequences of chronic obstipation may be classified as *slight*, *moderate*, or *extreme*, depending on the character and duration of the obstructing lesion, degree of coprostasis, and extent of auto-intoxication.

Obstipation may be induced by one or several lesions located in the colon, terminal ileum, sigmoid flexure, rectum, or at the anus, interfering with the passage of feces or defecation.

Obstipation is usually *continuous*, but is sometimes *intermittent*, depending on the degree of blocking and stasis; stools are slightly impeded or arrested to such an extent that impacted masses are

¹ See preceding chapter for a discussion of *atonic* or medical constipation.

continually present in the bowel and produce auto-intoxication, if not coprostatic diarrhea.

ETIOPATHOLOGY

Obstipation may be *congenital* or *acquired*, is encountered at all ages, and lesions producing it may be found anywhere along the gastro-intestinal tract; if chronic, these lesions are more frequently met in the terminal ileum, colon, sigmoid flexure, rectum, or at the anus.

Etiologic factors of mechanical stasis are manifold and varied; any lesions that compress, indent, constrict, angulate, twist, or occlude the bowel are causative factors in obstipation, since they interfere with propulsion or expulsion of feces.

Pathologic conditions in the upper and lower bowel causing obstipation and intestinal stasis differ markedly, and because of this and their varying location the author prefers to enumerate and then discuss them under two separate headings—*abdominal obstipation* and *rectal obstipation*.

ABDOMINAL OBSTIPATION

The following are the chief factors in this condition:

Congenital anomalies and displacements of the cecum, colon, and sigmoid flexure.

Extra-intestinal pressure.

Visceroptosis.

Cecum mobile.

Ileocecal valve incompetence.

Adhesions and contracting exudates.

Angulation—kinks.

Volvulus.

Myxorrhoea coli.

Hernia—extra- and intra-abdominal.

Mesenteric abnormalities.

Invagination and intussusception.

Colonic dilatation.

Hirschsprung's disease—megacolon, giant colon.

Benign and malignant neoplasms.

Stricture.

Pericolitis—perisigmoiditis.

Jackson's membrane.

Diverticulitis.

Enterospasm.

Ileocecal tuberculosis.

Foreign bodies and enteroliths.

Helminths.

Hypertrophy of O'Beirne's sphincter.

Lost pads and instruments.

Congenital anomalies and displacement of the colon and sigmoid flexure (Figs. 687, 690), such as absence, failure of descent and rotation, elongation, shortening, dilatation, atresia, angulation, twisting or transposition of the colon (Figs. 689, 690) or its segments are occasionally encountered, conditions that from birth

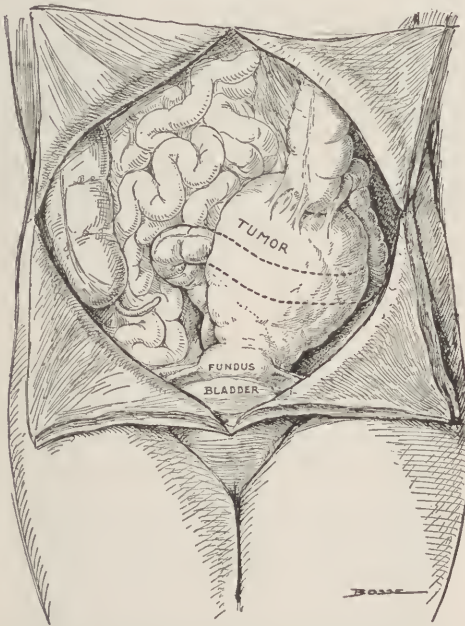


Fig. 841.—Obstipation with auto-intoxication induced by large uterine tumor that compressed and angulated the sigmoid flexure.

or later on block the bowel sufficiently to produce slight or serious intestinal stasis.

Extra-intestinal pressure (Fig. 841) involving the small gut, colon, or sigmoid flexure induced by pulling or pressure of a ptotic organ, tumor, chronic abscess, contracting exudate, disease, displacement or growth of the ovaries, tubes, uterus, or bladder, ascites, or diverticulum may impede or markedly retard evacuations.

Visceroptosis (Figs. 843, 844), congenital or acquired, concerning the intestine alone or plus other organs, is a common factor in obstipation of nervous emaciated individuals; a condition more

common in women and usually giving rise to mechanical obstipation.

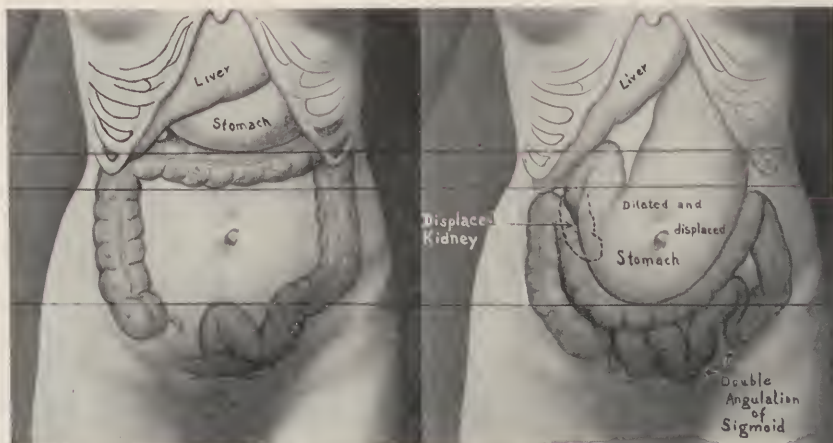


Fig. 842.—Schematic drawing indicating normal position of viscera.

Fig. 843.—Schematic drawing showing abnormal position of viscera in enteroptosis—Gernard's disease.

(Lines and umbilicus indicate degree to which ptotic organs are displaced.)

Cecum mobile—typhlotonia (Figs. 845, 847)—common in women, and characterized by cecal mobility, dilatation, and dis-

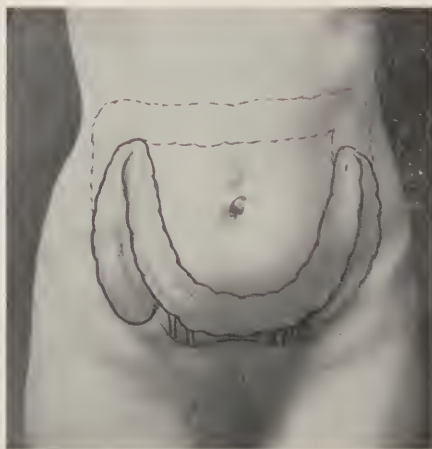


Fig. 844.—M-shaped ptosis of transverse colon with dropping and angulation of hepatic and splenic flexures.

placement, may be congenital or acquired, the result of delayed colonic rotation, an elongated mesentery, enteroptosis, or breaking



Fig. 845.—Normal position of cecum (left) and varying degrees of cecum mobile (right).



Fig. 846.—Marked ptosis of the transverse colon with looping of the sigmoid flexure.
Vol. 3—15

down of cecal attachments. Patients so afflicted complain of constipation and manifestations of auto-intoxication.

Ileocecal valve incompetency, according to Kellogg and Case, is a potent factor in intestinal stasis because regurgitation takes place through the valve (Figs. 849, 850), and feces that should have



Fig. 847.—Ptosis and cecum mobile. (Radiographed by Cole.)

been advanced back up in the ileum, dilate the gut, and cause poisoning and other gastro-intestinal disturbances. Case estimated that of his gastro-intestinal patients one in every six suffered from ileocecal valve incompetency, a percentage inconceivable to the author.

This condition may be congenital or acquired, be reflex or caused by muscular atrophy, fatigue, worms, ileocecal valve sphincter-
algia,

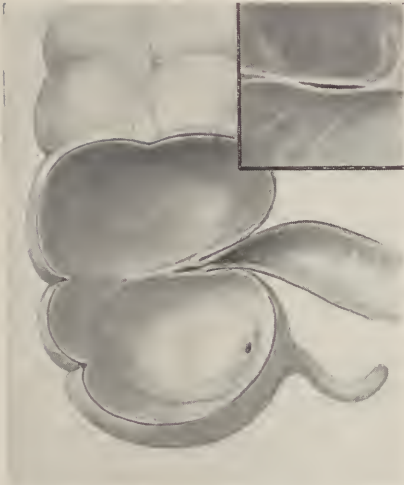


Fig. 848.—Normal cecum and ileocecal valve showing how distal ileum invaginates into the cecum.

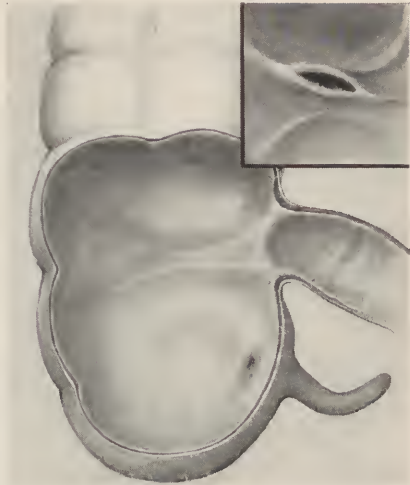


Fig. 849.—Incompetent ileocecal valve showing disinvagination of the ileum from the cecum.



Fig 850 —Ileocecal valve incompetence. Note bismuth in lower ileum. (Radiographed by Cole.)

ulcerative enterocolitis, cancer, fecal or gas distention, habitual large enemata, or by anything blocking the distal colon or rectum.



Fig. 851.—Radiograph of kinking—angulation—in the sigmoid colon.

Adhesions and contracting exudates (Figs. 854, 855), single or multiple, firm or soft, variable in length, width, and shape, that



Fig. 852.—Angulation of the hepatic flexure caused by exudates.

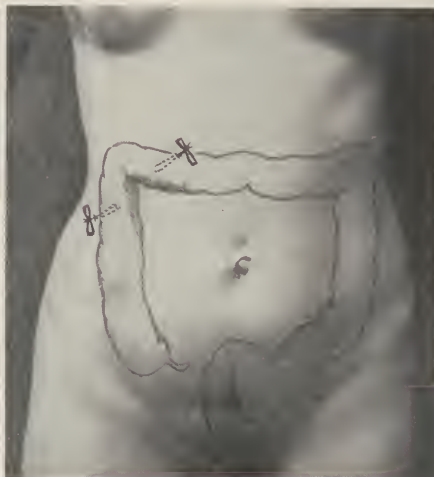


Fig. 853.—Angulated legs of gut separated by wiping bowel with gauze and colon anchored in position with suspension stitches.

compress, strangulate, displace, or angulate the gut, interfere with peristalsis, or in any way delay passage of feces, are responsible for

colonic obstruction, proximal dilatation, coprostasis, and auto-intoxication.

Tumefactions, inflammatory or neoplastic, causing agglutination of intestinal segments or bowel with other organs produce like results; chronic peritonitis with multiple adhesions is occasionally responsible for stasis.

Angulations and kinks (Figs. 852, 854), inherited or acquired, slight, moderate, or acute in degree, involving the ileocolic region and sigmoid flexure or other segments of the intestine, are common and cause slight or marked chronic intestinal obstruction and copremia.

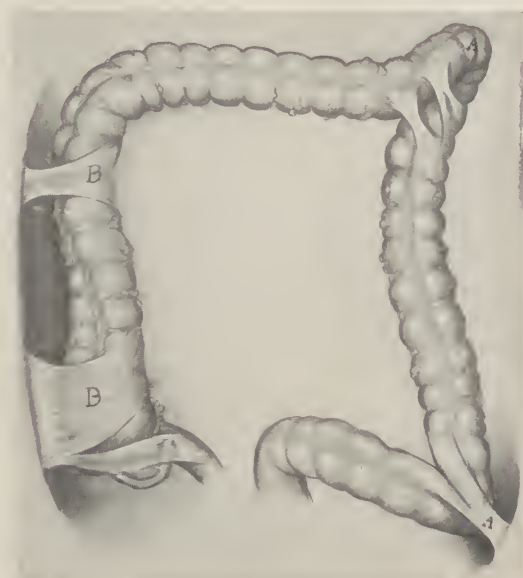


Fig. 854.—A, Thick band-like fibrous adhesions angulating the splenic and sigmoid flexure; B, vail or web-like membranes attached to and compressing the ascending colon, cecum, and appendix.

Lane has emphasized the frequency and importance of certain *kinks* involving the large and small intestine (Figs. 860, 861) frequently observed at (a) terminal segment of duodenum, (b) lower ileum—most common, (c) ileocecal and appendical regions, (d) hepatic flexure, (e) beginning of transverse colon, (f) splenic flexure, (g) sigmoid flexure, and (h) rectum, caused by adhesions resulting in distorted mesentery and compression, kinking, or twisting of the gut, responsible for chronic intestinal stasis.

Many interesting theories as to the production of Lane's kink will be omitted for lack of space.

The importance of these factors in obstipation have been grossly exaggerated, and too little value has been attached to rectal obstructive lesions more frequently responsible for chronic constipation and intestinal stasis. Occasionally a Meckel's diverticulum or unabsorbed omphalomesenteric duct act as a cause of chronic obstruction.

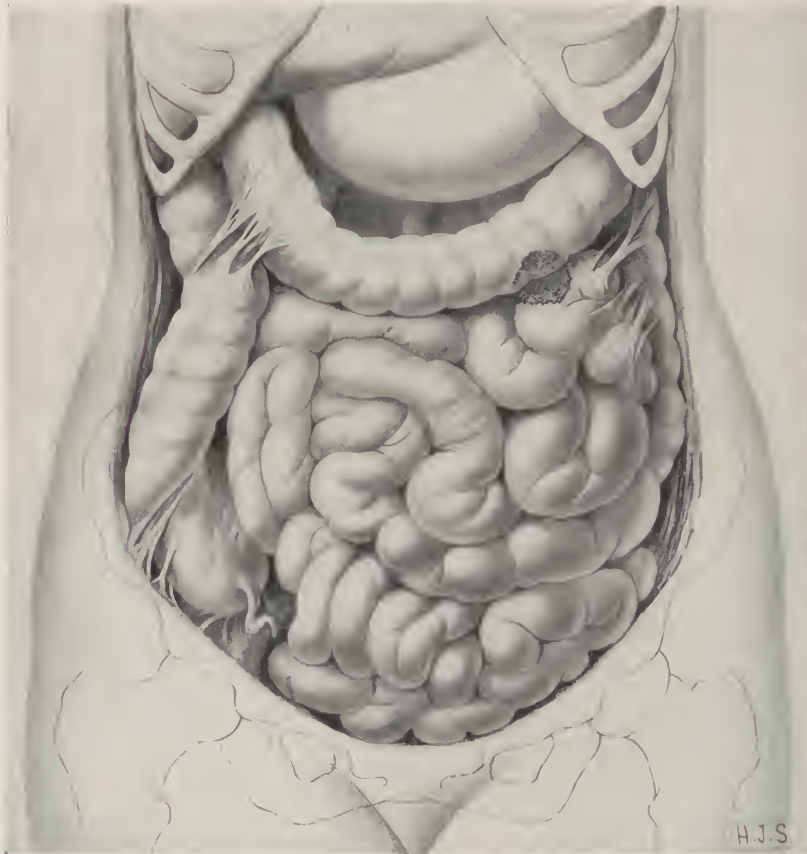


Fig. 855.—Exudative and bandular adhesions of colon, some of which caused compression and twisting—volvulus—of the cecum.

Myxorrhœa coli—membranous colitis—resulting in long strips, tube-like casts, or collections of dried mucus that irritate the bowel, will incite enterospasm and is a common cause of *spastic* mechanical constipation, and is always associated with *neurogenic* and other manifestations of colonic stasis and auto-intoxication.

Volvulus.—Where the intestine twists upon its own or mesenteric axis or encircles another loop (Figs. 862, 863), is induced by



Fig. 856.—Massing of descending colon and sigmoid flexure by adhesions.



Fig. 857.—*A*, Adhesions constricting the transverse colon; *B*, adhesions involving the descending colon.



Fig. 858.—Kinking of ileum proximal to cecum.



Fig. 859.—Membranous adhesions of the Jackson type angulating the lower ileum.



Fig. 860.—Radiograph of Lane's kink and angulation of the hepatic flexure.

a mobile gut, tumors, adhesions, or mesenteric torsion, common at the ileocecal and sigmoidal regions, is seldom chronic, but if so,



Fig. 861.—Exaggerated Lane's kink with associated angulation of appendix and ileocecal valve incompetence.

is accompanied by marked digestive disturbances, coprostasis, and auto-intoxication.



Fig. 862.—Volvulus of sigmoid flexure the result of amebic pericolicitis complicated by ulceration, adhesions, and polyposis.



Fig. 863.—Volvulus of redundant sigmoid induced by adhesions complicating sigmoidal carcinoma.



Fig. 864.—Enormous ventral colonic and enteric hernia resulting from improperly constructed artificial anus where the opening was made too small and constant straining ensued.



Fig. 865.—Radiograph of diaphragmatic hernia in boy caused by automobile accident. Herniated organs include stomach, duodenum, jejunum, ileum, transverse colon, and omentum. (Truesdale Clinic.)

Hernia—external and internal (Figs. 864, 865)—associated with stasis is more often due to involvement of the small bowel, but the cecum—particularly—and other colonic segments and sigmoid flexure have become herniated through slits in the peritoneum, diaphragm, omentum or hernial rings, independently or with small gut, and under such circumstances usually causes fecal retention.

Mesenteric abnormalities that lead to kinking or twisting of the bowel, caused by congenital or acquired elongation, torsion, adhesion, contraction, or tumor of the mesentery is a factor in obstipation.



Fig. 866.—Appearance of bowel as seen from above in invagination of sigmoid flexure into the rectum.

Invagination and Intussusception.—Invagination responsible for chronic intestinal stasis is usually encountered at the ileocolic angle—in children—where the ileum slips into the cecum; in adults more frequently at the rectosigmoidal juncture, in which case the sigmoid invaginates, filling the rectum (Figs. 867, 868), producing a constant desire to stool, which is not relieved by defecation. This type of obstipation is characterized by incomplete evacuations, postdefecatory straining, and fecal distention of the sigmoid flexure; the invagination may be limited or extensive, and the sigmoid remain in the rectum or protrude beyond the anus.

Colonic dilatation (Fig. 869) may involve the whole or individual segment of the large intestine, but is most common at the cecum, sigmoid flexure, and rectum; the condition may complicate atonic constipation and obstipation, or any disease that impairs peristalsis and glandular secretion or blocks feces and gas; which, habitually retained in large amounts, lead to distention, dilatation, and impairment of bowel function, these in turn aggravating intestinal stasis.



Fig. 867.—Invagination of sigmoid into rectum as felt with finger or seen from below through a proctoscope.

Hirschsprung's disease (see Chapter LXXXIX)—congenital colonic dilatation, hypertrophy, or elongation of the colon—megacolon, invariably accompanied by stasis and auto-intoxication, has been observed and treated five times by the author. For a consideration of these cases and detailed discussion of congenital colonic dilatation the reader is referred to the following chapter.

Benign and malignant neoplasms or large exudates, that by their size press upon from without or occlude the bowel from within, cause constipation or costiveness alternating with loose movements, and finally diarrhea when obstruction is nearly complete; in such cases the patient suffers from coprostasis plus toxemia

incident to the growth or exudate, retained feces, and absorption of toxins from discharges where tumors have degenerated and crater-like ulcers have formed (Fig. 870).

Stricture (Fig. 870) induced by malignancy, operation, injury, catarrhal, syphilitic (Fig. 871), tubercular (Fig. 765), amebic, balantidic, inflammatory, or ulcerative processes, coloproctitis,



Fig. 868.—Invagination of the sigmoid flexure induced by large polyp and stricture involving the lower sigmoid flexure. Patient cured by sigmoidectomy.

depending upon the degree of enterospasm and the obstruction, is a cause of infrequent or incomplete evacuations, bearing-down sensations, and frequent desire to stool, whether the constriction is of the *annular* or *tubular* type. In such cases fecal retention, erosions, and ulcers on the upper surface of the stricture favor the absorption of toxins as exhibited by the clinical picture of these patients.

Pericolitis and **perisigmoiditis** (Figs. 872, 874) secondary to inflammatory and ulcerative lesions in the bowel, or to abdominal or pelvic disease, immobilizes the gut, lessens glandular secretion, and causes or aggravates existing constipation and auto-intoxication; *mesocolitis* acts in a similar manner.

Jackson's membrane is a pterygium-like, irregularly shaped veil that extends from the peritoneum of the lateral abdominal wall across the lower ascending colon and cecum, where it fuses



Fig. 869.—Radiograph of markedly dilated cecum and colon.

with the parietal peritoneum or mesocolon. These membranous-like processes resemble thickened peritoneal folds, thin, broad, or fan-shaped adhesions, and usually contain fibrous striæ and blood-vessels paralleling the long axis of the bowel, and may be firmly attached to or glide over the gut (Figs. 875, 876).

Jackson's membrane is encountered most frequently in men from forty to sixty years old, afflicted with inflammatory disease of intestine, abdomen or pelvis, or anything causing the production of irritating toxins or localized inflammation. Charles Mayo

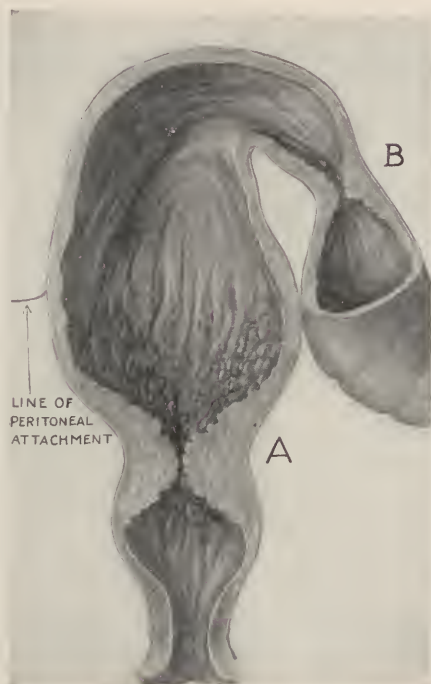


Fig. 870.—Multiple stricture: A, Rectal; B, sigmoidal.

believes it is caused by late rotation and descent of colonic segments; Lane attributes it to evolutionary changes consequent on

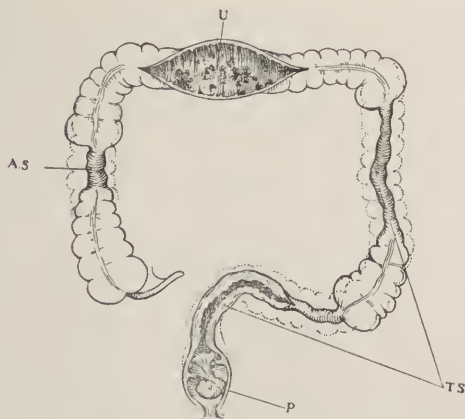


Fig. 871.—Multiple stricture of the colon due to luetic ulceration: A.S., Annular stricture; U, ulcers; T.S., tubercular tortuous strictures; P, rectal polyp.

strain due to the upright posture; others consider it as a developmental defect.

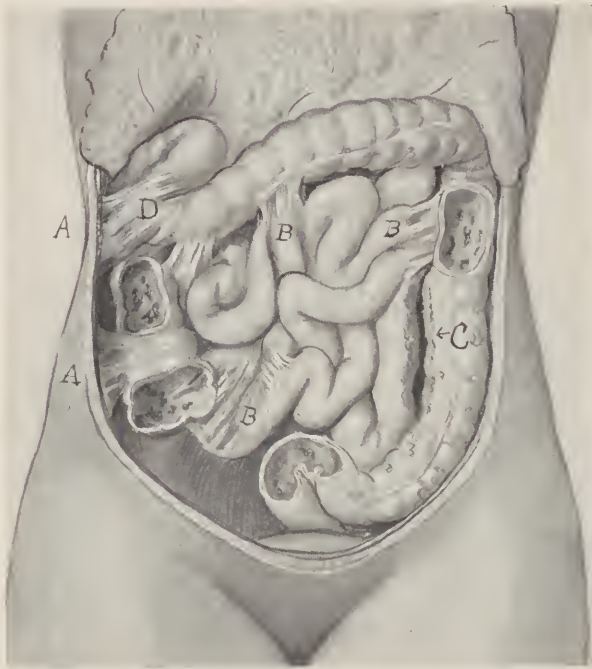


Fig. 872.—Pericolitis—extensive adhesions complicating ulcerative colitis: *A*, Veil-like adhesions resembling Jackson's membrane; *B*, ordinary adhesions binding loops of the small intestine and colon together; *C*, raw areas left following separation of exudative adhesions; *D*, angulation of the transverse colon.



Fig. 873.—Neoplastic stricture involving rectum and sigmoid flexure. (Radiographed at Broad Street Hospital.)



Fig. 874.—Massive adhesions—pericolicitis—complicating amebic colitis with polyposis.



Fig. 875.—Typical veil-like Jackson's membrane and interspersed vessels.
Vol. 3—16

Similar membranes have involved all colonic segments, but are encountered more frequently at the cecum and sigmoid flexure,

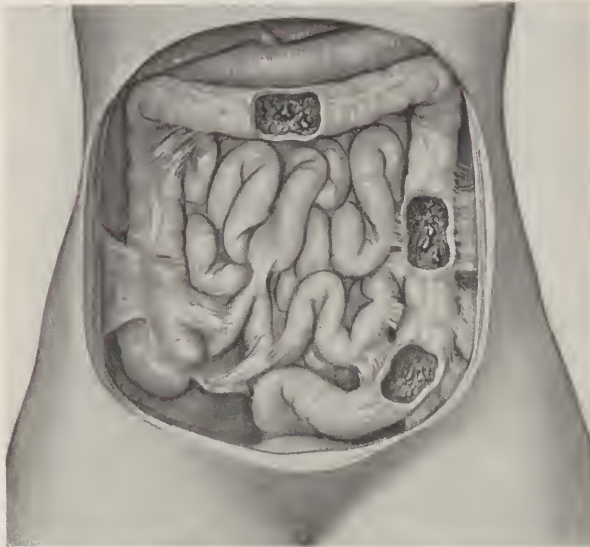


Fig. 876.—Jackson's membrane, adhesions, and typical Lane's kink complicating chronic ulcerative colitis with polyposis.

where they tend to elongate and compress the bowel, which is followed by dilatation above. This condition, which Jackson says



Fig. 877.—Membranous pericolicitis. Note the pseudoperitoneal—Jackson's—membrane which binds the ascending colon, cecum, and appendix to the lateral parietal peritoneum.

is not yet fully understood, may exist without symptoms or may induce fecal stagnation.

Diverticula, inherited—Meckel's—or acquired, may through pressure or peridiverticulitis and deposit of inflammatory products occlude the bowel and produce stasis. Their usual site is at the sigmoid flexure, but they have been met with throughout the small and large intestine and rectum (see Chapter LXXXV).

Enterospasm, an occasional factor in mechanical constipation, is induced by inflammatory or ulcerative areas, acrid discharges, foreign bodies, or any lesion that through irritation incites the circular and longitudinal muscle-fibers to prolonged simultaneous contraction (Fig. 948).

Foreign bodies, gall-stones, and enteroliths, free or encysted, have in rare instances induced obstipation and stasis.

Helminths—lumbricoid and tapeworms—have been known to block the bowel by their bulk (Fig. 750), or through enterospasm caused by irritation.

Hypertrophy of O'Beirne's Sphincter.—The thickened muscular band located at the rectosigmoidal juncture is a frequent factor in copremia, and acts continuously until the irritant which is exciting muscle-fibers to contract is removed.

Tubercular neoplasms, usually located in the cecum or rectum, are an occasional factor in obstipation or surgical constipation.

RECTAL OBSTIPATION—CONSTIPATION

Obstipation induced by rectal lesions is quite common; more frequently encountered than mechanical constipation due to Lane's kink, Jackson's membrane, ileocecal valve incompetence, or other abdominal lesions, causing stasis, some of which have been unduly emphasized.

Below are enumerated the principal lesions and conditions responsible for rectal obstipation—constipation:

Congenital anomalies of rectum or anus.

Extrarectal pressure.

Diverticulitis.

Helminths.

Stricture.

New growths.

Chronic abscess and fistulæ.

Hypertrophied rectal valves.

Procidentia recti.

Foreign bodies.

Enteroliths.

Sigmoid invagination.

Cryptitis.

Fecal impaction.

Hypertrophy of the levator ani muscle.

Narrowing of the anal canal.

Deviated coccyx.

Hemorrhoids.

Hypertrophy of the sphincter ani.

Proctitis—periproctitis.

Fissure and ulcers.

Hypertrophied papillæ.

The relief and cure of constipation that so often follows insignificant or major operations for anorectal affections demonstrates the frequency of obstruction in the terminal bowel. In rectal obstipation patients feel feces low down prior to stool; this can be demonstrated through the proctoscope, digital examination, or by administering a small injection, 3iv to vj (120.0–180.0); when the block is in the sigmoid or colon, fecal matter remains there, the patient has no desire to stool, and a 2- to 4-quart enema is required to procure an evacuation.

Congenital deformities, such as narrowing of the anal outlet, closure of the opening by membranes or bands, absence of or an imperforate anus (Fig. 119), and fecal fistula communicating with other organs, imperforate rectum, and total obliteration of the lower bowel, together with the sequelæ of operations performed for the relief of these conditions, are among the causes of this type of obstipation.

Extrarectal pressure, caused by prostatic enlargement, retro-displaced uterus, vesical calculi, any extrarectal tumor, sacrococcygeal cysts or deformities, and periproctitic inflammatory deposits, is a common factor in rectal stasis.

Stricture—anal or rectal—however induced, interferes with the passage of feces proportionate to the degree of mechanical obstruction.

New growths, large or small and numerous, first induce constipation and later alternating obstipation and diarrhea as rectal occlusion becomes more complete.

Chronic abscess and fistula characterized by large inflammatory deposits sometimes immobilize, shorten, and narrow the rectum, thereby interfering with defecation and complete evacuations; contraction of old exudates may also distort the rectum.

Hypertrophied rectal valves arrest downward passage of the feces, which accumulate in the sigmoid flexure to a greater or less degree.

Procidencia recti and **sigmoid invagination** is an occasional factor in obstipation because movements take place in the distal end of the invaginated or protruding narrow gut instead of the capacious normal rectum.

Foreign bodies, variable in size and shape, that have gained entrance to the bowel by way of the mouth, anus, or rectovesical septum occasionally induce painful defecation or imperfect stools by occluding the bowel.

Fecoliths and **enteroliths** and *intestinal calculi* of different kinds (Fig. 937) have also induced rectal obstipation through their original size or by acting as a nucleus around which feces gradually accumulated to form large obstructing tumors, or by obstructing more completely an already narrowed gut.

Fecal impaction, in the form of large, firm, putty-like masses or hardened scybalaë, the result of invalidism, old age, parietic conditions, carelessness, obstructing bowel lesions, etc., prevents normal stools, and when chronic is characterized by constant dribbling of fluid feces through the anus (see Chapter XC).

Hypertrophic tuberculosis, having been fully discussed in Chapter LXXIII, needs no further consideration here.

Hypertrophy of the levator ani muscle, a complication of rectal and perirectal irritating lesions and reflex disturbances, greatly retards evacuations or induces *fragmentary* constipation, owing to contraction and scissors action of the muscle upon the feces preceding or during defecation.

Narrowing of the anal canal induced by congenital defects, irritable anorectal musculature, stricture, or tumor is characterized by painful defecation, incomplete evacuations, deformed stools, and coprostasis.

Hemorrhoids sometimes cause constipation by blocking the anal canal or inciting sphincteralgia.

Hypertrophy of the sphincter ani interferes with satisfactory movements through spasmodic contractions that close the anus as an evacuation is about to take place (see Chapter XIV devoted to Sphincteralgia).

Fissures and ulcers at the anal margin cause painful defecation and unsatisfactory movements by inducing muscular irritability.

Hypertrophied anal papillæ may by their size obstruct the anal canal or incite sphincteralgia (see Chapter XII).

Cryptitis in exceptional instances prevents satisfactory movements, causes painful defecation, and muscular contractions.

Deviated Cccyx.—Where segments are long and bend inward,

so that the *tip* indents or irritates the rectum, is an occasional factor in obstipation.

SYMPTOMS AND END-RESULTS OF ABDOMINAL AND RECTAL OBSTIPATION

The *manifestations* of obstipation or chronic intestinal obstruction vary greatly, according to the idiosyncrasy of the patient, to the nature of the one or more lesions causing it, duration of the block, degree of stasis, and extent and manner in which *absorbed toxins* temporarily or permanently affect the patient.

When the obstructing lesion is slight movements are nearly normal and but little fecal matter is habitually retained, and it is difficult to differentiate between the symptoms of *atonic* and *obstructive* constipation. Later, as lesions occlude the gut to a greater degree, cause inflammation or ulceration, toxemia is more in evidence, and localization phenomena—soreness, pain, gas distention, or swelling—become manifest, and evacuations are longer delayed and less complete.

In extreme cases of obstipation where the bowel is almost completely blocked coprostasis is marked and continuous, and stools are delayed for days or weeks; feces are evacuated at irregular periods in enormous amounts, are unnatural in shape, being in the form of pencil or ribbon-like pieces, firm, putty-like lumps or large and small hardened masses, scybala smeared with mucus, blood-tinted, with an abnormal disgusting odor, and associated with discomfort or sharp pain when expelled. The evacuation in cases of retained fecal impactions is immediately followed by the discharge of considerable offensive fluid feces containing more or less mucus and blood, if not pus.

While systemic disturbances and discomfort arising from retained feces are similar in *abdominal* and in *rectal* constipation with auto-intoxication, local manifestations differ.

Obstruction located in the small intestine, colon, or sigmoid flexure in most instances interferes with digestion, incites reverse peristalsis, causes colic, tympanites, rumbling noises, soreness, and tenderness at a definite spot; fecal accumulations in the intestine and colon have a tumor or sausage-like formation, and when occlusion is nearly complete there occur the usual indications of acute obstruction.

Manifestations of *rectal* vary greatly and are more distressing than those of *abdominal* obstipation because of the nature of lesions responsible for it.

Hypertrophy of *rectal valves* is accompanied by a feeling of distention in the upper rectum; *narrowing of the anal canal* by

uncomfortable defecation and ribbon-like stools; *hypertrophy* and *irritability* of the *levator ani* muscle by spasmodic closing of the bowel as defecation takes place, and fragmentary evacuations; *proidentia* by extrusion of the gut; *hemorrhoids* by hemorrhage, protrusion, and discomfort; *abscess* and *fistula* by induration, tenderness, pain, and discharge of pus; *fissures*, *ulcers*, *hypertrophied papillæ* and *cryptitis* by sphincteric spasm, smarting burning sensation and post-defecatory pain, and *hypertrophy* of the *anal muscle* by painful evacuations and sphincteralgia.

When there is a *tumor* or *stricture* with impacted fecal mass due to these or lesions mentioned, the patient complains of weight and fulness in the lower bowel, constant desire to stool, and unrelieved sensation following defecation.

Discharges of mucus, pus, and blood, and diarrhea alternating with constipation complicate rectal lesions causing obstipation more often than those of the colon and sigmoid flexure.

Individual discussion of the manifold symptoms accompanying obstipation or intestinal stasis with auto-intoxication is impracticable in a work of this description, and because of this and his having done so elsewhere¹ the author will content himself with enumerating and emphasizing those deserving special consideration. Manifestations arising from obstipation with intestinal stasis due to obstructing lesions may be grouped into *early*, *intermediary*, and *late* including end-results.

Early Symptoms.—In the beginning constipation is slight, the patient suffers from varying degrees of frontal headache, lack of mental concentration, troubled sleep, unrefreshed feeling in the morning, flashes before the eyes, dizziness, and disinclination for social or business affairs.

Intermediary Symptoms.—Systemic manifestations of this stage of obstipation are: anorexia, furred tongue, bad taste, foul breath, nausea, gaseous eructations, sallow complexion, malaise, despondency, and indicanuria; in addition, and in accordance with the lesion and consequent obstruction, gas distention, coprostasis, colic and abdominal soreness, tenderness on pressure, mucus in the stools and considerably retarded and incomplete evacuations are present, unless the trouble is in the rectum, when weight, fulness, and bearing-down sensations are added; defecation is painful, and evacuations are followed by prolonged discomfort incident to sphincteric contraction.

Late Symptoms.—When *obstruction* is unrelieved for months or years or increases in severity, evacuations become slight, farther

¹ Gant, Constipation, Obstipation, and Intestinal Stases, W. B. Saunders Company.

and farther apart; considerable or enormous amounts of hardened feces continuously remain above the block to irritate or destroy epithelium, set up a catarrhal inflammation or induce pressure, ulceration, backing up of gas, reverse peristalsis, tenderness, colic—localized and general—abdominal bulging, coprostatic diarrhea, retention of fermenting and putrefying food remnants, all of which favor multiplication of pathogenic bacteria and absorption of toxins.

Chronic coprostasis through resultant weight, pressure, and irritation incident to frequent fecal accumulations leads to colonic angulation, dilatation, displacement or adhesions, or by pericolitis, and may induce reflex or direct ovarian, tubal, uterine, and prostatic disturbances, procidentia recti, hemorrhoids, and fissure.

In extreme cases of stasis with *auto-intoxication* the skin is marked by brown blotches, acne, urticaria, erythema, etc., there is marked anemia, lowered blood-pressure, and the patient suffers from neuralgia, fecal fever, and melancholia.

End-results.—Authorities have attributed the following symptoms, complications, and end-results to *bacterial infection* and *toxemia* arising from chronic obstipation—*stasis*—with *auto-intoxication*, viz., degenerated body tissues, ulcerated gums, endocarditis, pyorrhea alveolaris, degeneration of the breasts, arthritis—rheumatism, gout—loss of hair, appendicitis, cystitis, endometritis, salpingitis, cholecystitis, peritonitis, pancreatitis, thyroid gland, hepatic and pancreatic disturbances, duodenal dilatation and ulcers, abscess, eye and bone affections, and visceroptosis.

Obstipation and chronic intestinal auto-intoxication through systemic weakening also predisposes the patient to tuberculosis, cancer, Still's disease, nephritis, arteriosclerosis, other chronic ailments, and acute terminal infections. Obstipation with intestinal stasis and auto-intoxication undoubtedly cause much distress, but it is questionable if the above serious manifestations and end-results are very often due solely to infection and toxemia consequent upon retained feces.

For a detailed discussion of the theories advanced for and against *auto-intoxication* in connection with atonic constipation and obstipation or stasis, the reader is referred to Chapter X, pages 133–138 of the author's work entitled *Constipation, Obstipation, and Intestinal Stasis*, 1916.

DIAGNOSIS

A study of the characteristics of *atonic constipation* previously outlined, together with the diagnostic features of *obstipation* given

below, will assist the reader in differentiating between these conditions, which is sometimes difficult.

Stasis consequent upon chronic intestinal obstruction is frequently due to congenital gastro-intestinal defects that are troublesome at first, and interfere more and more with regularity and completeness of evacuations as the patient grows older.

Gourmandizing, irregular habits, digestive disorders, invalidism, and factors in ordinary constipation aggravate, but do not cause obstipation.

Systemic manifestations in all forms of chronic constipation are similar, but when infrequent or incomplete stools with *copremia* are caused by an obstruction in the small intestine, colon, sigmoid flexure, or rectum typical local symptoms are manifest.

Abdominal lesions blocking the small intestine, colon, or sigmoid vary according to type and severity; but in nearly all at some stage the patient suffers from palpable fecal impactions, dis-



Fig. 878.—Olive-tipped flexible sound and irrigator useful for locating and treating high rectal and sigmoidal strictures.

tention of a particular bowel segment, feeling as if feces were arrested at a given point, slight or active reverse peristalsis, abdominal soreness, tenderness on deep pressure, localized peristalsis, discomfort or colic, and gas eructations; when the block is marked, nausea, vomiting, singultus, accelerated pulse, copremia fever, nervousness and pallor during periods of coprostasis, which, in addition, may be accompanied by continuous watery discharges.

Lesions of the *rectum* and *lower sigmoid* inducing stasis can be diagnosed with certainty by inspection through proctoscope or sigmoidoscope, digital examination of the rectum, and palpation of the sphincter and perianal regions with the patient in a suitable posture. New growths, strictures, foreign bodies, hypertrophied valves with impacted fecal masses located in the rectum are always accompanied by weight, fulness, and bearing-down pain, together with straining, tenesmus, and unrelieved sensation following defecation.

Diverticulum, chronic abscess, and fistula are characterized

by induration and thickening of the tissues, discharge of offensive yellow *pus*, and mild or severe evidences of *sepsis*. Polyps, procidentia, and enlarged internal hemorrhoids *protrude* during stool, and their retraction may be prevented by sphincteralgia, narrowing of the anal canal, and irritability of the levator ani or sphincter muscle, *change* shape of the feces or cause *fragmentary* evacuations; fissures and irritable, inflammatory, and ulcerative lesions, small polyps, inflamed crypts, and hypertrophied anal papillæ located in



Fig. 879.—Volvulus complicating a redundant sigmoid flexure. (Radiographed by Cole.)

the terminal rectum invariably cause or aggravate obstipation and cause *pain* during or following defecation by inciting short or prolonged *contractions* of the sphincter muscle.

While useful, the value of *fluoroscopic examination* and *radio-graphs* (Figs. 879, 880) of the gastro-intestinal tract has been *greatly overrated* in obstipation, and operations should not be *based on them* unless the diagnosis is confirmed by clinical symptoms, physical examination, and other measures. The introduction of *bougies*, unless made through the proctoscope with the occlusion in



Fig. 880.—Marked ptosis of the transverse colon with redundancy of the sigmoid flexure.
(Radiographed by Cole.)

view, is to be condemned, since they induce considerable pain and may *perforate* or *rupture* the ulcerated bowel.



Fig. 881.—Adherent tangle—adhesions—of intestine in left iliac region.

Inflation occasionally assists one to *isolate* the involved segment of gut by making it more prominent and facilitating percussion and palpation, but it is not a safe diagnostic aid, as the diseased bowel may be severely injured and even ruptured through distention.

Enemata are helpful for diagnosing rectocolonic lesions as shown by results in procuring evacuations with different sized



Fig. 882.—Radiograph of cecum mobile. Enlarged cecum is seen crossing the sigmoid flexure on the left side of the pelvis; note lower ileum distended with the barium enema indicating ileocecal valve incompetence.

injections: when 6 ounces is effective, the trouble is in the lower rectum; when a quart is required, the lesion is in the sigmoid; but when from $\frac{1}{2}$ to 1 gallon enema is necessary to empty the bowel, the obstruction is probably in the upper colon or cecum.

Finding of luetic stigmata with repeated positive Wassermanns points to *syphilitic*—gummatous—stricture; *tubercular* lesions are

searched for when patient appears tubercular, tubercle bacilli are found in the stools or sputum, and the Von Pirquet reaction is present; and finally, *helminthic* irritation or obstruction is suspected when lumbricoid or tapeworms, their segments, or ova are detected in the stools.

Blood, urinary, and fecal examinations are useful in clearing up the diagnosis in obscure cases.

TREATMENT

Therapeutic measures employed to relieve or cure *obstipation* are *medical* and *surgical*, the former being used to procure daily



Fig. 883.—Splanchnoptosis, general ptosis, Glénard's disease, in multipara aged forty, with overhanging abdomen.

evacuations as needed, lessen distressing manifestations, and improve the general condition; while the latter is resorted to for the purpose of permanently correcting or removing chronic obstructive lesions responsible for intestinal stasis and auto-intoxication.

From what has been said concerning the character, etiology, and manifestations of chronic obstructions with fecal toxemia it is apparent that routine treatment in this class of cases is not feasible.

Medical Treatment.—Owing to chronic bowel blocking the intestinal musculature becomes *atonic* or inactive through pressure

of fecal accumulations, disturbance of nerve mechanism, result of distention and fatigue arising from abnormal reverse peristalsis, and glandular secretion is *impaired* from these and other factors accompanying coprostasis and necessity of keeping the bowel open.

The medical treatment of *atonic* and *obstructive* constipation—obstipation—is practically the same (see preceding chapter).

Medical measures, including corsets and belts (Figs. 885, 886), are *palliative* and their employment is unjustified except for individuals who decline surgical intervention, to prepare the patient for an operation that gives hope of permanent relief, and to rebuild and make the sufferer comfortable following correction or removal of the lesion causing the block.



Fig. 884.—Exaggerated coloptosis without corset.



Fig. 885.—Colon and sigmoid flexure replaced and held in their normal positions with aid of the Munson corrective corset.

Briefly stated, this consists in encouraging the patients to associate with agreeable companions, sleep in well-ventilated rooms, participate in outdoor exercises and games, keep regular hours, eat moderately of wholesome food and fruits, drink freely of cool or warm water, particularly on arising, administering blood and nerve tonics, mineral or vegetable oils to lubricate the bowel and soften feces, prescribing laxatives and cathartics as required to procure needed evacuations, employing physiotherapy—massage, vibration, electricity, and hydrotherapy—to stimulate glandular secretions, restore tone to the abdominal and intestinal musculature, and facilitate elimination of toxins, and employing small or large warm water,

soapsuds, or oil enemata when other remedies fail to empty the bowel of retained semisolid feces and hardened or impacted fecal masses.

Surgical Treatment.—Chronic—mechanical constipation—intestinal obstruction—obstipation—is a surgical disease, and medical treatment is not indicated except to strengthen the system, alleviate symptoms, minimize auto-intoxication, and procure satisfactory evacuations in patients declining operation. In such cases surgical intervention must be insisted upon as soon as the sufferer begins having continuous coprostasis, hemorrhages, or exhibits serious manifestations of intestinal obstruction or auto-intoxication.



Fig. 886.—Method of applying binder employed by the author in the treatment of colonic ptosis and enteroptosis.

Since lesions causing obstipation vary in degree from an anal fissure to grave abdominal affections, operations required to relieve stasis from bowel blocking may be slight, difficult, or complicated and dangerous. Multiple operations at the same or different times involving both the rectum and abdomen may be required in some cases, and following elimination of obstructions patients convalesce more quickly when *appendicostomy* or *cecostomy* and through-and-through *colonic irrigations* are provided for to hasten drainage and relieve manifestations of auto-intoxication and a course of post-operative *constructive* treatment is carried out.

During operations for stasis it is advisable to correct non-intestinal lesions affecting the patient's bowel or general health.

Surgical procedures are *curative* when obstructing lesions are permanently eradicated, and *palliative* when irremovable and the

involved gut must be *short-circuited* or *excluded*, or an *artificial anus* established to alleviate distressing or dangerous symptoms and procure satisfactory evacuations.

Nature of the operation and what it will probably accomplish should be explained to the patient, otherwise he may anticipate complete or immediate relief, when weeks or months of postoperative treatment may be necessary to eliminate effects of the obstruction with auto-intoxication and restore his health.

Preparation of the patient being the same in these as for other abdominal and rectal operations given elsewhere, further consideration of the subject is unnecessary.

Anesthesia is *local* for most rectal and *general* in the majority of abdominal operations, but in borderline cases the operator must

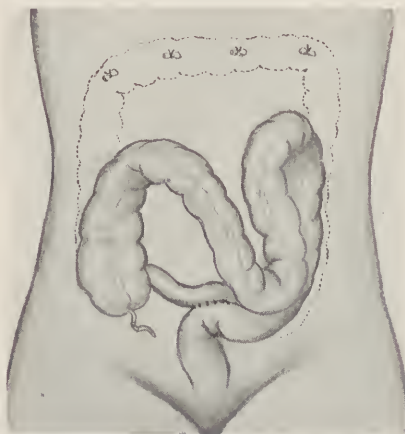


Fig. 887.—Congenital colonic ptosis responsible for stasis and auto-intoxication relieved by colopexy and ileosigmoidostomy.



Fig. 888.—Obstruction of the rectum caused by retroverted uterus.

use his judgment when deciding between infiltration anesthesia and general narcosis.

Owing to the varied lesions causing and serious complications frequently associated with obstipation and intestinal stasis the operator to be successful and avoid a high mortality must possess an excellent technic developed through a wide experience in abdominal and anorectal surgery.

Surgical Treatment of Abdominal Obstipation.—*Congenital colonic anomalies* (Fig. 887) may cause death within a few hours or days, or be of such a nature that the infant cannot undergo the prolonged operation required to correct them. In cases of partial obstruction stasis sooner or later ensues through displacement,

angulation, twisting, dilatation, or occlusion of the bowel, under which circumstances it is relieved or cured by freeing and suturing the gut in its normal position; dividing adhesions or fibrous cords or removing Meckel's diverticulum constricting the intestines; dissecting loose, straightening out, and anchoring twisted or distorted colonic segments; diminishing size of an abnormally dilated gut by coloplications or resecting the strictured or occluded intestine.

In inoperable cases, inoperable because of the patient's age, vitality, or complicating nature of the lesion, troublesome and

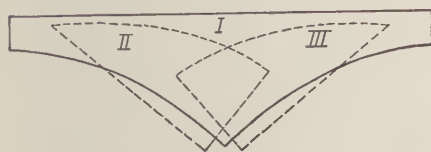
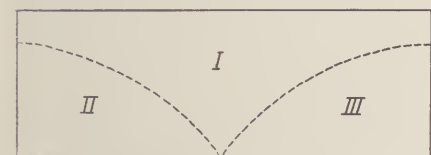


Fig. 889.—Pattern for cutting Rose plaster binder, useful before and following colopexy.

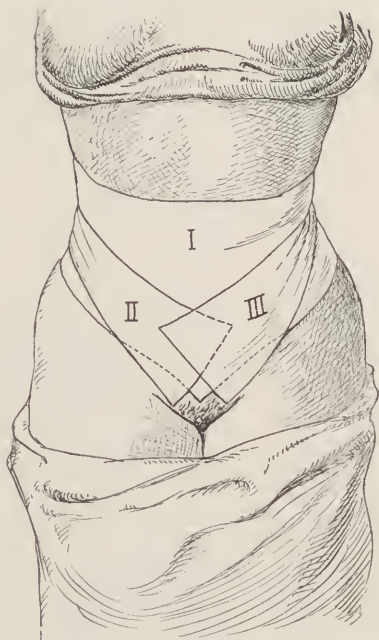


Fig. 890.—Rose plaster binder in position.

dangerous colonic obstipation is quickly relieved by short-circuiting, excluding the blocked bowel, or establishing an artificial anus that feces may escape until the patient can withstand a more satisfactory operation.

Extra-intestinal pressure (Fig. 841) varies, and in different cases is relieved by severing or breaking up adhesions and exudates, removing Jackson's membrane, replacing and suturing ptotic viscera, extirpating neoplasms, correcting retroversion and uterine procidentia, operating upon abdominal and pelvic suppurative diseases, and eliminating lesions of whatever kind that from without diminish intestinal lumen.



Fig. 891.—Potsis of right half of colon relieved by colopexy.

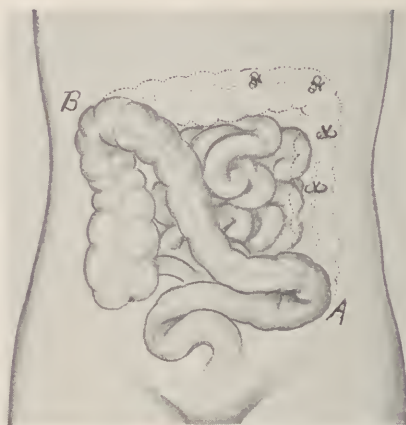


Fig. 892.—Ptosis of the left half of the colon relieved by colopexy.

Visceroptosis (Figs. 880, 843) may concern a single or all abdominal organs, the small or large intestine, one or more colonic

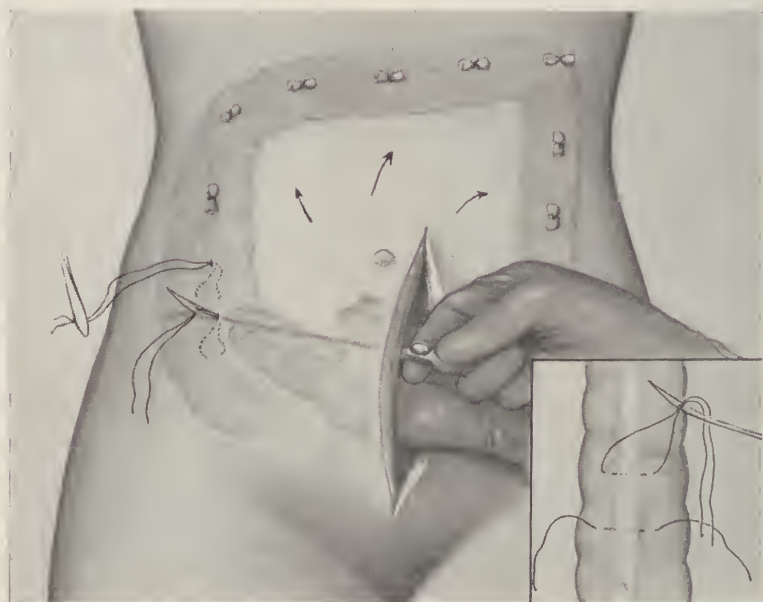


Fig. 893.—Author's technic of complete colopexy performed through a single incision with the aid of Riverdin's needle. Insert: Method of introducing suspension sutures beneath longitudinal band.

segments, hence a simple is indicated in one and a complex operation in another.

In correcting obstipation with auto-intoxication due to splanchnoptosis, enteroptosis, or coloptosis (Fig. 891) the author has found it necessary to perform nephropexy, splenopexy, hepatopexy, gastropexy (Fig. 984), cecopexy, colopexy (Fig. 893), and sigmoidopexy (Figs. 896, 897) alone or in conjunction; but usually replacing and anchoring the cecum, colon, or sigmoid flexure in position with suspension of the stomach in aggravated cases has succeeded in correcting stasis and relieving manifestations of enteroptosis.

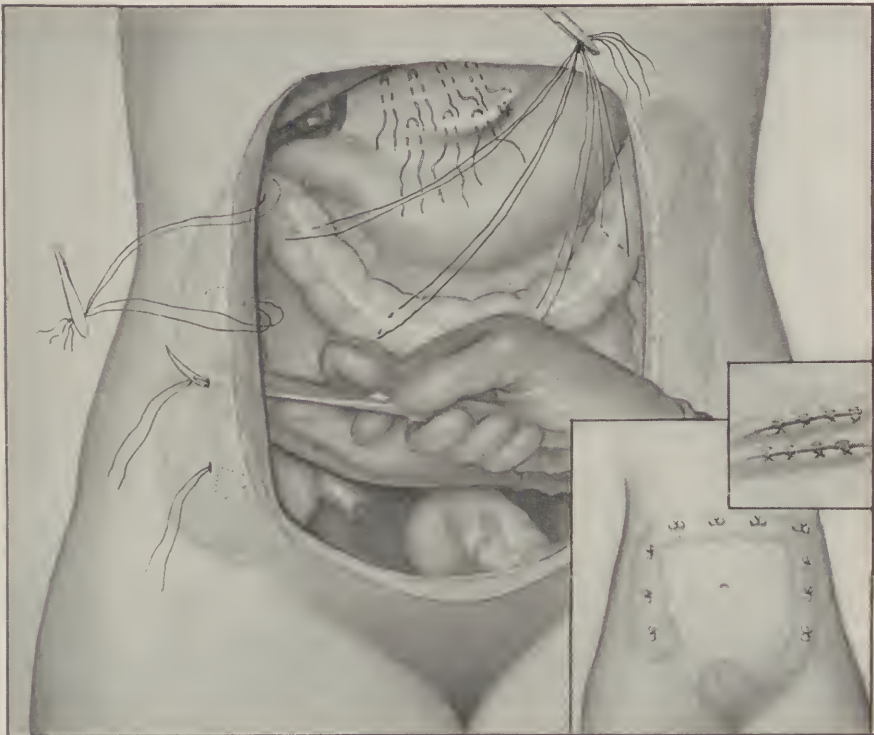


Fig. 894.—Steps in *gastrocolopexy*: Upper and lower inserts show the manner in which the stomach and colon are restored and held in their normal positions when sutures have been tied.

With these procedures long-suffering patients are relieved or cured after dieting, medical treatment, mechanical appliances, and physical measures have failed; but relapse may occur unless with the aid of systematic postoperative treatment emaciation is overcome, the patient's general condition is improved, and the sufferer's abdominal and intestinal ligaments, nerves, and musculature are strengthened.

Cecopexy, Colopexy, and Sigmoidopexy.—These operations

(Figs. 893, 897) are simple, reliable, and practically devoid of

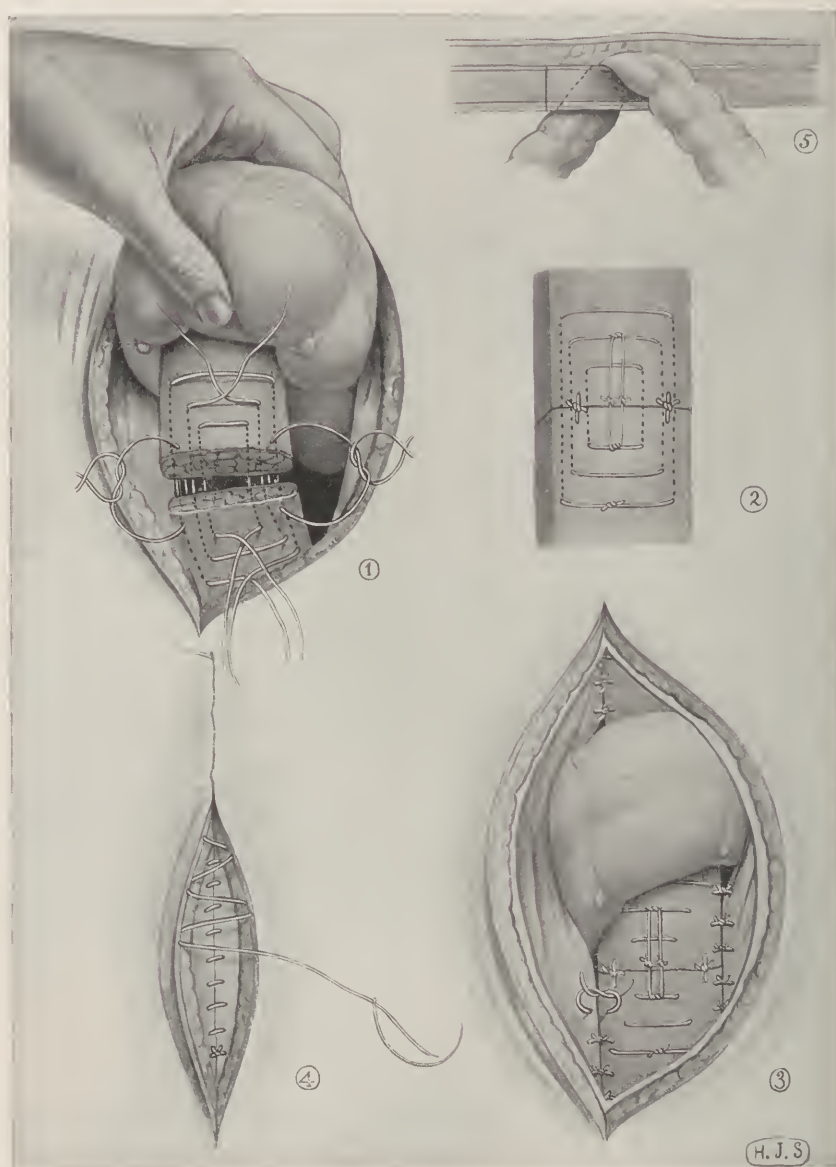


Fig. 895.—Colopexy: Principal steps in author's colopexy where the bowel is suspended on the rectus muscle, employed in extreme cases of colonic ptosis.

mortality. Frequently when the entire colon is displaced gastro-colopexy is necessary (Fig. 894).

The author has performed cecopexy, 50; partial, 20, and complete colopexy, 10; colopexy and gastropexy, 10, and sigmoidopexy

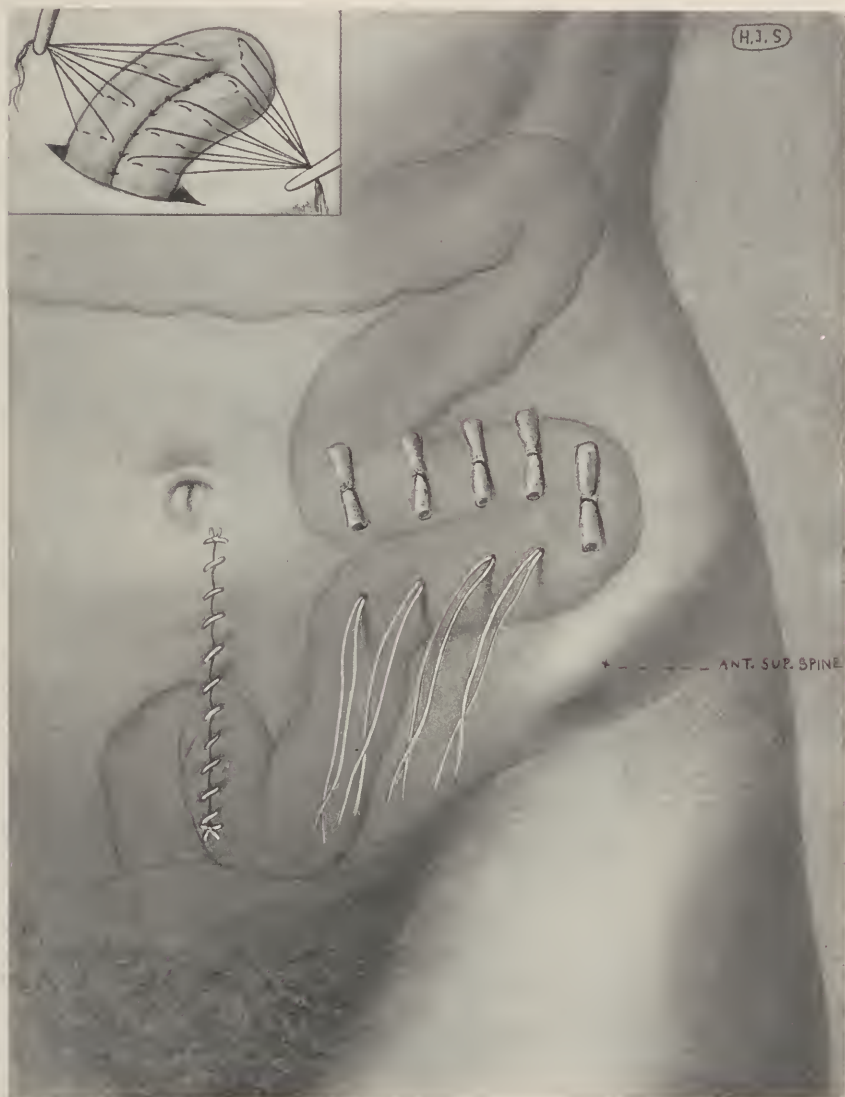


Fig. 896.—Sigmoidopexy: Steps in author's colopexy where slack is taken up by forming an extra loop in the descending or other colonic sigmoid.

100 times for the relief of stasis and auto-intoxication caused by chronic invagination of the sigmoid flexure into the rectum (Fig. 897).

Thirty of the above cases—appendicostomy 20 and cecostomy 10—were performed providing for medicated through-and-through irrigation, to facilitate convalescence from auto-intoxication. Results from these procedures with bowel flushing have been very gratifying, and the author recommends them in connection with other operations employed for the relief of chronic intestinal obstruction inducing stasis.

The technic of cecopexy, colopexy, and sigmoidopexy differs but slightly, and because of this and the frequency of sigmoidal *ptosis* with *invagination* the author will describe sigmoidopexy only.

Sigmoidopexy.—The abdomen is opened by a 3-inch *left rectus* or a 6-inch *median* incision when other colonic segments



Fig. 897.—Author's circular sigmoidopexy performed for ptosis of sigmoid flexure (insert) with invagination into the rectum. Angulation is avoided by attaching the gut in a circular manner (see Fig. 915).

are to be anchored. The sigmoid flexure—or colon if necessary—is located, freed by breaking up adhesions and exudates, and brought outside following an examination made to determine whether other organs are ptotic or there is an obstructing lesion. After scarification three or more linen sutures are introduced beneath the longitudinal band and carried through the abdominal wall at the side of the wound (Fig. 893) with the aid of a long handled needle (Fig. 894). The peritoneum is removed on either side of the cut to permit agglutination of the bowel and fascial lining to avoid sagging that ensues when gut is attached to serosa. Fascia—including muscle—is approximated by a chromicized catgut lock-stitch and skin edges joined by a running small linen, silk, or catgut con-

tinuous suture; when there is tension or the wound is large, two or more deep reinforcing interrupted figure-of-8 silkworm-gut stitches are introduced.

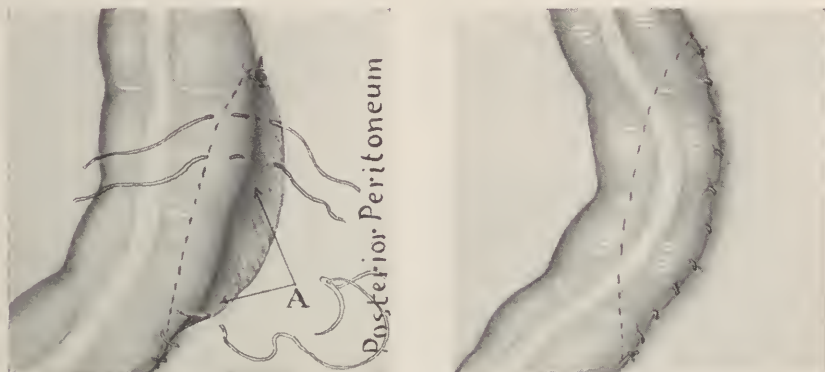


Fig. 898.—Preliminary and final steps in sigmoidopexy for ptosis where the gut is attached to the iliac fascia (Ball's operation).

The operation is completed by tying the linen suspension stitches across rubber tubings (Fig. 987) and placing a dry sterile dressing upon the wound. Angulation must be avoided or stasis will recur, hence bowel is sutured to the abdomen in the form of a

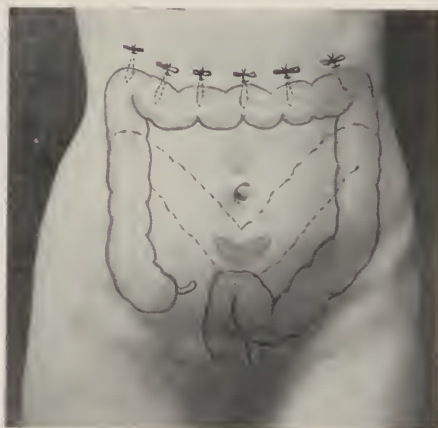


Fig. 899.—V-shaped ptosis of colon corrected by colopexy. Dark area indicates point at which feces collected in ptotic gut.

curve (Fig. 987), sutures being placed about 1 inch apart. In *colopexy* the gut is replaced and anchored to the abdomen at one or several points (Fig. 893), according to indications, and when dilated it is anchored following *ceco-* or *coloplication* (Fig. 916).

Varying technics of these operations have been amply discussed and illustrated in the author's work on Constipation, Obstipation, and Intestinal Stasis, 1916.

Attaching the sigmoid and colon to the posterior or lateral abdominal parietes after removing the peritoneum intact (Fig. 900) has proved satisfactory in the writer's practice.

Mesocolopexy.—Mesocoloplication (Fig. 903, *C*), performed several times, has been abandoned by the author owing to hemorrhage

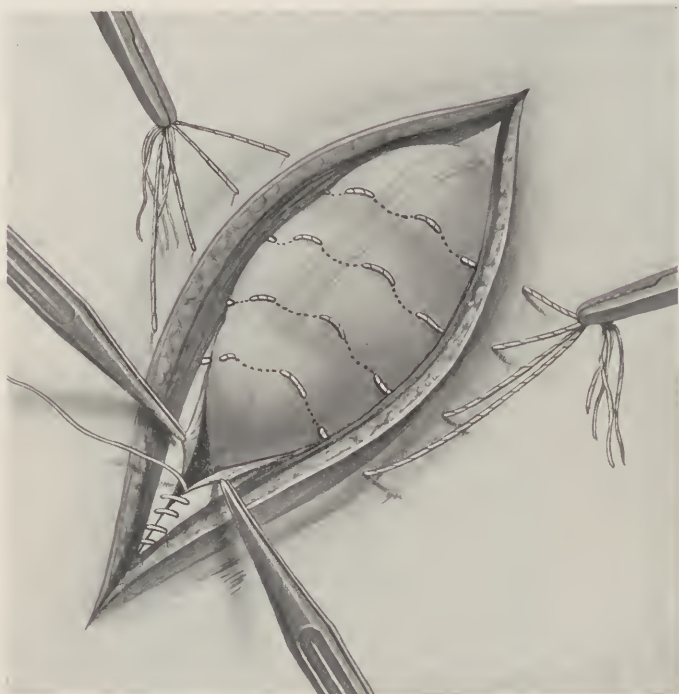


Fig. 900.—Method of introducing suspension sutures bringing colon in contact with the transversalis fascia in colopexy.

ensuing from needle wounds, formation of massed postoperative adhesions, and failure in overcoming ptosis.

Phrenocolopexy—anchoring of the transverse colon to the diaphragm—was effective in 3 of the author's cases, serving to overcome coloptosis and stimulating colonic activity through the frequent up-and-down movements of the diaphragm.

Colopexy with invagination has been useful in extreme cases of ptosis complicated by marked dilatation. The procedure consists in scarifying, invaginating one segment into another, and stitching the bowel *in situ*, followed by colopexy performed in the usual way.

Colopexostomy, or bringing the slack or ptotic gut outside, anchoring, and removing a segment to form an artificial anus, or performing entero-anastomosis (Fig. 902) has been practised by the author in a few instances where the large intestine was ptotic, involved by ulcerative colitis, malignancy, or polyposis.

In splachnoptosis with marked gastropotosis good results are not to be expected unless colopexy is reinforced with *Rovsing's*

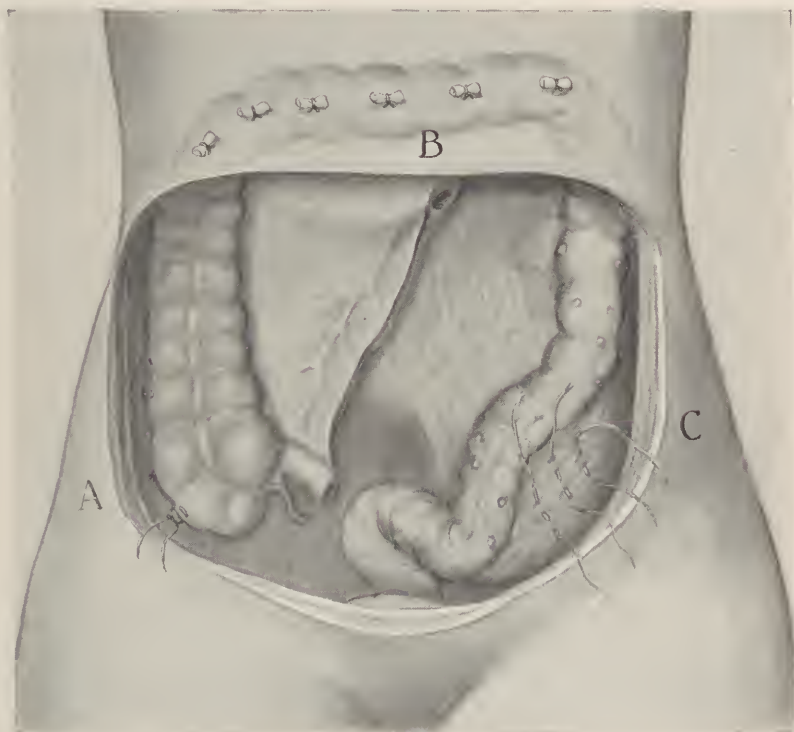


Fig. 901.—Different methods of performing colopexy—correcting colonic ptosis: *A*, Where the gut is sutured to adjacent peritoneum; *B*, the bowel is anchored to the anterior abdominal parietes—colopexy; *C*, the colon is restored to its normal position by infolding attached mesentery—mesocolopexy.

gastropexy and shortening of the gastrohepatic and gastrocolic omenta, or performing *Coffey's omentalopexy*.

Intestinal exclusion alone or in conjunction with colopexy or sigmoidopexy was found adequate in several cases where the colon was unduly long, collapsed and angulated, twisted or bound down by adhesions, and anchoring it to the abdominal wall would not have restored its function (Fig. 902).

Resection is not justifiable in colonic or sigmoidal ptosis except when a displaced segment is immobilized, occluded, or

diseased by lesions that cannot be corrected by medical measures or less radical surgical procedures.

Cecum mobile (Fig. 845) is corrected by suturing the cecum to the lateral parietal peritoneum, suspending it to the anterior abdominal wall—cecopexy—as in sigmoidopexy (Fig. 903, *B*), pocketing it in the pelvis beneath the peritoneum—Wilm's method (Fig. 903, *A*)—shortening the mesocolon—mesopexy (Fig. 903, *C*)—by infolding stitches and by stripping off the peritoneal covering, twisting it into a cord, and attaching it to the abdominal parietes (Gregory). Of these procedures, cecopexy is the simplest, causes less discomfort, fewer complications, and is most effective.

When the cecum is markedly dilated it is reduced to the desired size by one or more cecoplications after the plan employed

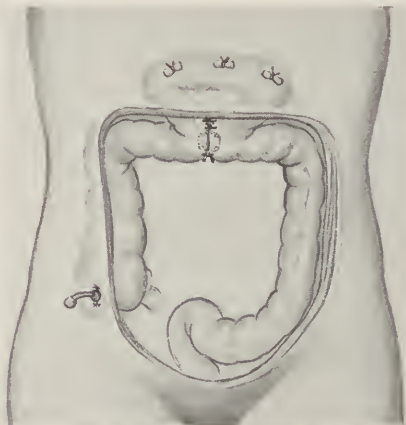


Fig. 902.—Aggravated colonic ptosis with marked auto-intoxication cured by the author's colopexostomy, appendicostomy, and through-and-through colonic irrigation.

in correcting colonic dilatation (Fig. 910). Wearing a belt, regulating the diet, physiotherapy, and medication relieve, but never cure this condition.

Ileocecal valve incompetence (Figs. 848, 849), frequently met with by Kellogg and Case, has occasionally been encountered by the author. Stasis and auto-intoxication from this source is frequently relieved by exercise, massage, vibration, and hydrotherapy, cutting down proteins, modifying intestinal flora, and employing Metchnikoff's *Bacillus bulgaricus*, and other acid-forming bacteria.

Case and Kellogg report good results from the above plan of treatment, and Kellogg's operation for restoring competency of the ileocecal valve, which has for its object reinvagination of the withdrawn ileum (Fig. 904).

Technic.—When the *habenula*—muscular band—is ruptured Kellogg places a suture through the seromuscular coats of the cecum and ileum at such points as will cause slight intussusception of the ileum, and follows this with a stitch through ends of the *habenula*, which when tied restores intussusception of the ileum and narrows the ileocecal opening. The same object is accomplished by a single but more complicated suture shown in Fig. 904.

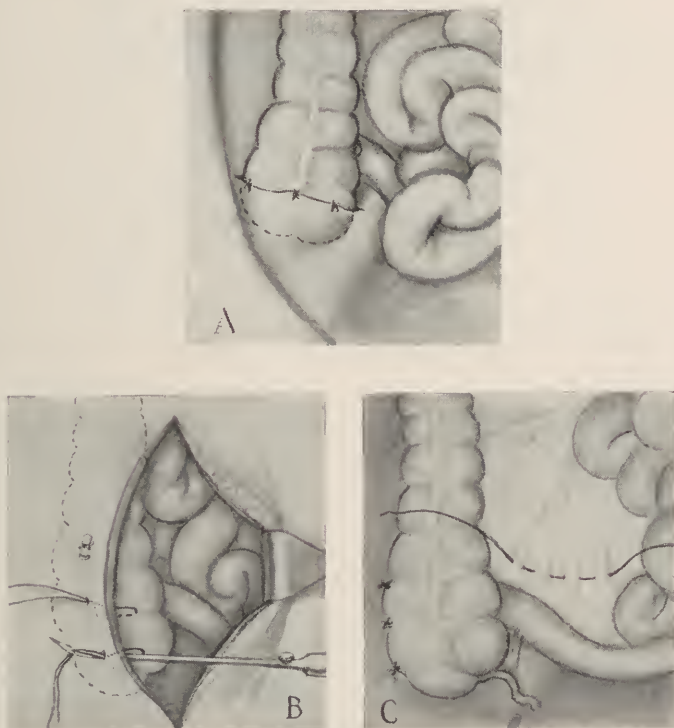


Fig. 903.—Different methods of correcting cecum mobile: *A*, Cecum is pocketed beneath the peritoneum; *B*, cecum is anchored to the anterior abdominal wall—cecopexy; *C*, mesentery of the bowel is shortened by plication following suturing of the cecum to adjacent peritoneum.

Results in 26 cases operated showed complete relief in 84.6 per cent. as demonstrated by testing the valve before closing the abdomen and subsequent roentgenologic studies.

From a study of the author's and observation of cases operated upon by Kellogg and others it appears the procedure is effective in about 50 per cent. of cases, but since this operation is usually performed in connection with other procedures it is difficult to determine the exact value of repairing the valve.

Ileocecal valve incompetency the result of atony, congenital anomalies, helminths, newgrowths, ileocecal tuberculosis, ptosis,

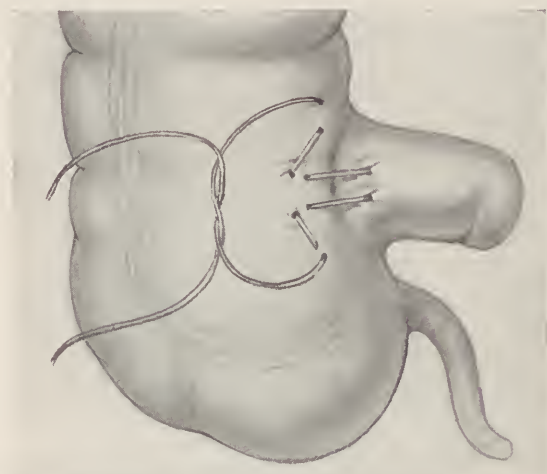


Fig. 904.—Kellogg's operation for ileocecal valve incompetency with reinvagination of the withdrawn ileum into the cecum.

angulation, and fatigue or irritation consequent on ulcerative colitis accompanied by diarrhea and acrid discharges is not



Fig. 905.—Lane's kink formed by adhesions welding together ileum, cecum, and appendix. The knife and heavy dotted lines indicate direction of cuts made in dividing adhesions and liberating bowel.

benefited by Kellogg's technic, and requires an operation that removes the cause of incompetency, following which the ileocecal valve is repaired if necessary.

Adhesions and tumefactions (Fig. 855) are sometimes overcome by physiotherapy, but, as a rule, surgical intervention is required. The work may be done by a direct, but when their location and extent is unknown they are best approached through a free median or rectus incision. To avoid danger from hemorrhage and injury to the intestine the involved organ should be brought into view, carefully examined, and no attempt made to separate adhesions by traction.

Veil-like adhesions are destroyed and *agglutinated* surfaces of gut are easily separated by gently wiping the intestine in one direction and then another with gauze; *thread-like* are broken up



Fig. 906.—Thin, broad, sheath-like adhesions compressing and narrowing the lower ileum. Dotted lines indicate direction taken by scissors in severing them.

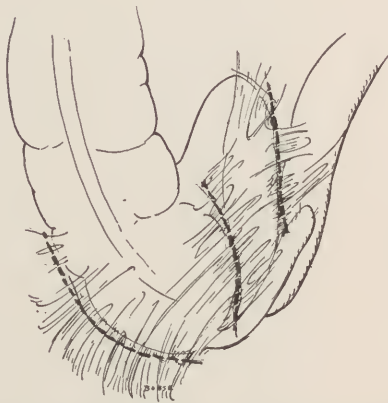


Fig. 907.—Double angulation—kinking—of ileum. Heavy dotted lines indicate lines of incision made in severing adhesions.

with the finger, and narrow or broad *band-like* fibrous adhesions are severed with knife or scissors, using ligatures when required. When broad and firmly attached, bowel dissection is abandoned and adhesions are divided, leaving ends attached to the bowel, a piece of the omentum, uterus, or a tumor is left attached to the gut when it cannot be separated without injury to intestinal tunics that might result in fecal fistulæ.

In deplorable cases of adhesions it may be necessary to *resect*—partial or complete *colectomy*—or exclude by *ileosigmoidostomy* the involved bowel.

Prophylaxis against postoperative adhesions consists in operating quickly and aseptically, carefully handling viscera, arresting

bleeding, covering the raw surfaces with peritoneum, augmenting peristalsis, postural treatment, and gentle massage. Oil, salt solution, and other agents left in the abdomen to facilitate lubrication and prevent agglutination have been of no apparent benefit in the author's cases.

Angulations and kinks—Lane's—are frequently eliminated by destroying adhesions in the above manner. In the large intestine angulation occurs most frequently and to a more marked degree at the cecum and sigmoid flexure. Mild distortion of the sigmoid

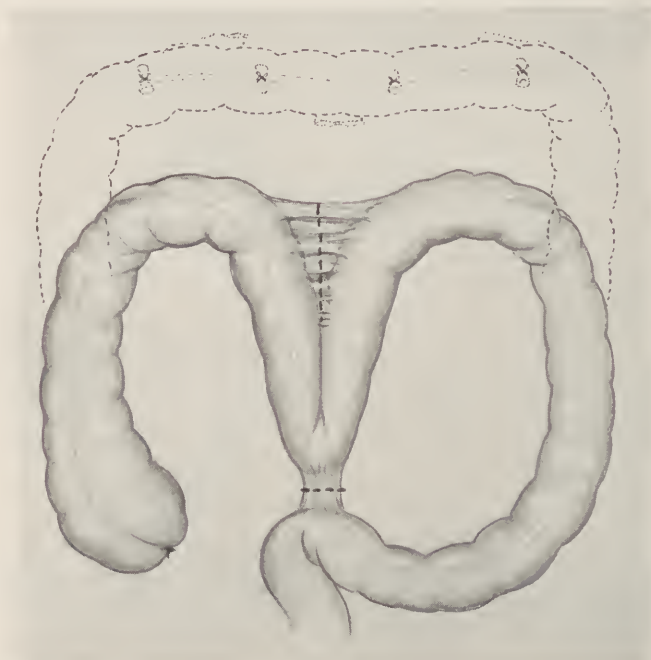


Fig. 908.—Marked angulation of transverse colon relieved by incising adhesions (dotted lines), straightening and anchoring colon to the abdominal wall—colopexy.

is occasionally corrected by massage, inflation, and manipulation from below with a Wales bougie or sigmoidoscope.

In mild and aggravated cases operation is imperative, and when separation of agglutinated surfaces and severing of binding or constricting adhesions fail to eliminate an angulation or kink in the bowel after being straightened by traction, is restored and fixed in its normal position by *colopexy* or *sigmoidopexy* (Fig. 897). In extreme or inoperable cases *ileosigmoidostomy*, *colostomy*, or *excision* of the distorted gut may be necessary.

The same principle is generally involved in the treatment of Lanes' kink. Kinking at the *duodenojejunal* juncture is overcome by freeing, straightening out, and suturing the gut to the transverse mesocolon. Lane's ileal kink is corrected by dividing adhesions parallel with the bowel and suturing the rent vertically or otherwise, as is shown in the accompanying illustrations (Figs. 909, 910).

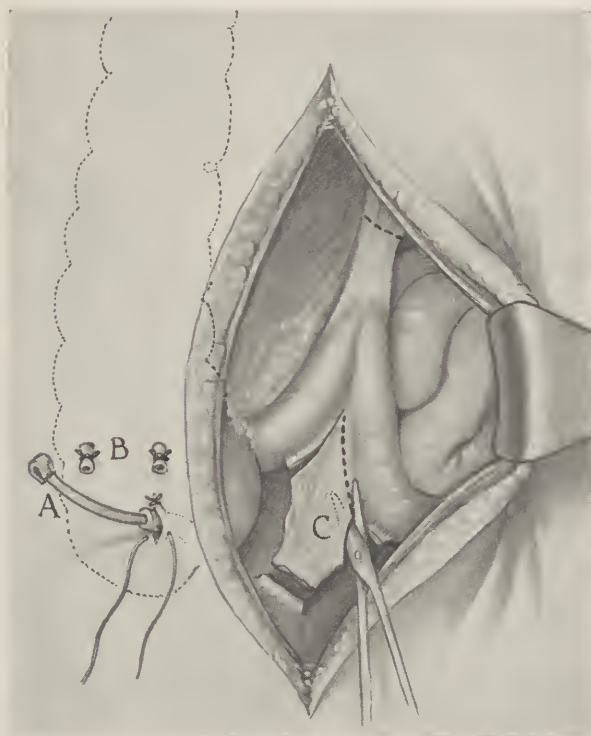


Fig. 909.—Typical Lane's kink formed by heavy band-like adhesions. Consequent stasis and auto-intoxication relieved by (C) severing adhesions with scissors, (A) performing appendicostomy (for drainage and irrigating purposes), and practising through-and-through colon irrigation; B, cecal suspension sutures.

When an angulated segment of the small intestine or colon, after being liberated, tends to fall into an abnormal position, *mesopexy* is performed, or the gut is restored and anchored in its natural position by suturing it to the omentum, parietal peritoneum, or an adjacent organ.

Volvulus is corrected by severing adhesions, separating the bowel from agglutinated intestinal segments or organs, unraveling the twist, and attaching the gut to other structures or abdominal

wall to prevent relapse. When this is not feasible because of its complexity, *enterostomy*, *colostomy*, *enterectomy*, or *colectomy* is imperative to relieve stasis or save the patient's life when the bowel is gangrenous or its function is destroyed.

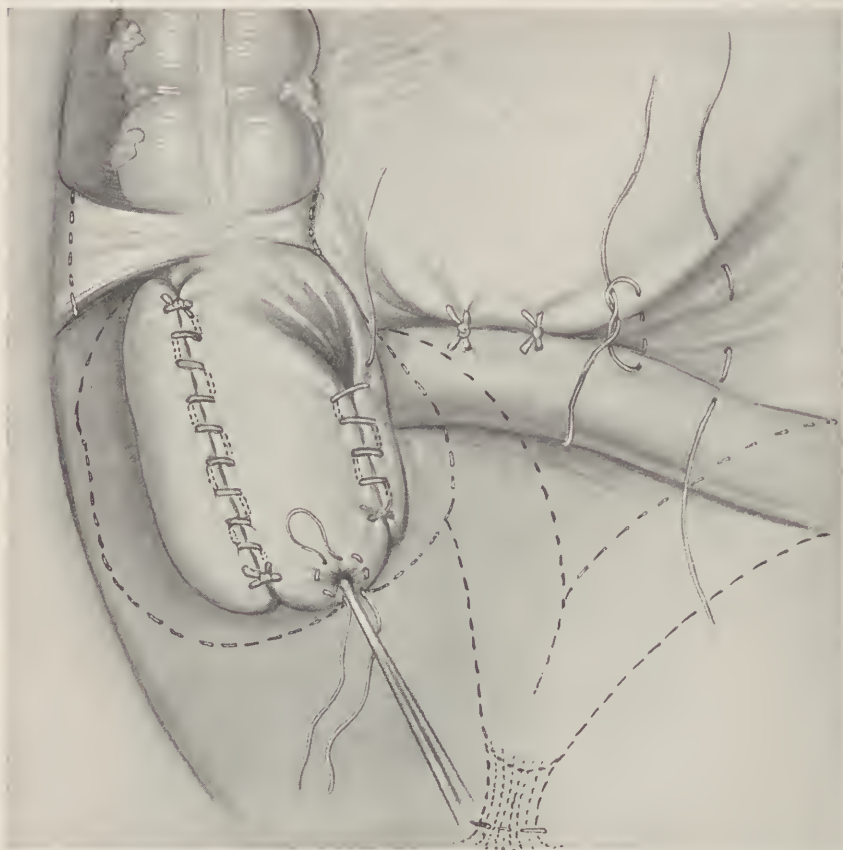


Fig. 910.—Operative procedure employed by the author in the radical treatment of a patient suffering from appendicitis and chronic intestinal stasis caused by a dilated cecum, Jackson's membrane, and Lane's kink sharply angulating the ileum. Operation: (1) Division of and peeling off of Jackson's membrane; (2) straightening out and anchoring ileum to adjacent parietal peritoneum; (3) appendectomy with inversion of the stump, and (4) plication and fixation of the cecum.

Hernia (Fig. 865) involving the colon, sigmoid flexure, or rectum is rare, and since operations required to correct this variety of rupture are similar to those employed where the small intestine is concerned, discussion of their technic has been omitted. In rectal hernia the author takes slack out of the pelvic peritoneum by circular plication (Fig. 912) and performs sigmoidopexy (Fig. 915).

Mesenteric abnormalities responsible for obstipation are overcome by *mesopexy* in *colonic ptosis* or *resection* along with adjacent

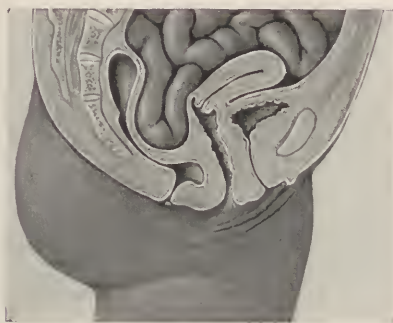


Fig. 911.—Hernia of Douglas' culdesac that blocked the rectum, causing constipation and auto-intoxication, corrected after the plan shown in Fig. 912.

gut when there is torsion of the mesentery or mesocolon, or these structures are involved by operable new growths.



Fig. 912.—Obliteration of Douglas' culdesac by plicating pelvic peritoneum to relieve rectal hernia.

Invagination—intussusception (Fig. 913)—is dangerous when *acute*, and causes troublesome stasis with auto-intoxication when *chronic*. One is not justified in temporizing with medical and

physical measures in this class of cases and should open the abdomen and deal with the bowel directly, which is usually at the ileocecal



Fig. 913.—Schematic drawing showing rectum filled with invaginated sigmoid and constriction at point of invagination at rectosigmoidal juncture.

juncture or sigmoid flexure. Owing to inflammation, swelling, and agglutination, liberation of the invaginated gut is difficult in acute, but in chronic cases the upper can be withdrawn from a

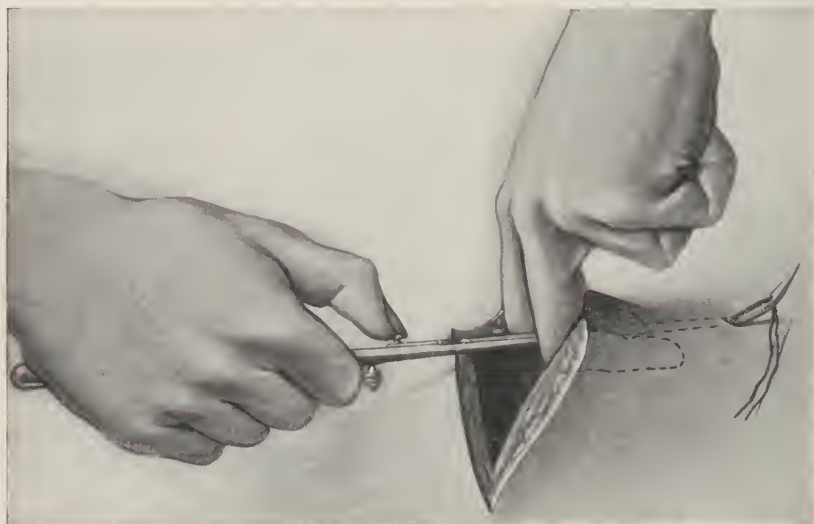


Fig. 914.—Long handled needle—Riverdin's—employed in author's colopexy and sigmoidopexy. With this instrument and fingers used as a guide all segments of the colon are anchored to the anterior abdominal parietes through a single medium or rectus incision (see Fig. 893).

lower segment without difficulty; reinvasion is prevented by shortening the mesentery with infolding stitches (Fig. 903, C),

suturing the gut to adjacent organs, omentum, or peritoneum (Fig. 910), or performing *cecopexy*, *colopexy*, or *sigmoidopexy* (Figs. 913-915).

Invagination of the sigmoid flexure into the rectum (Fig. 913) is the most common cause of abdominal obstipation, and the author has performed *sigmoidopexy* for the relief of this condition 100 times, and with gratifying results in most instances. Since invagination, particularly of the large gut, is often associated with *splanchnoptosis*, restoration and fixation of the colon and other organs is often required at the same operation.

Colonic Dilatation.—Hirschsprung's disease (Figs. 916, 931) and megacolon is difficult to completely relieve, but *acquired* colonic dilatation the result of atonic or mechanical constipation, paresis,



Fig. 915.—Schematic drawing showing invagination withdrawn and bowel anchored to the transversalis fascia after removal of peritoneum—sigmoidopexy after it has been pulled upward and made taut.

or invalidism may be righted by single or multiple coloplication (Fig. 916) reinforced by *colopexy* when the bowel is ptotic. Where distortions are secondary to adhesions, kinks, tumors, or other obstruction causing fecal and gas retention, the offending lesion is eliminated before the caliber of the bowel is diminished by infolding, otherwise the operation accomplishes little or nothing.

Frequently colonic dilatation is associated with *enteroptosis* and replacement and fixation of the gut is necessary, but when the large bowel is extensively involved by adhesions or growths *short-circuiting*, *colostomy*, or *colectomy* are unavoidable.

Colonic elongation is corrected after the plan shown in Fig. 917.

Hirschsprung's disease and megacolon—giant colon (Figs. 931, 932)—is improved by *coloplication* reinforced by *colopexy*; but in these cases putting the large bowel at rest by *short-circuiting*

the colon—*ileosigmoidostomy* (Fig. 935)—gives better results or effects a cure following which the bowel may be restored to its

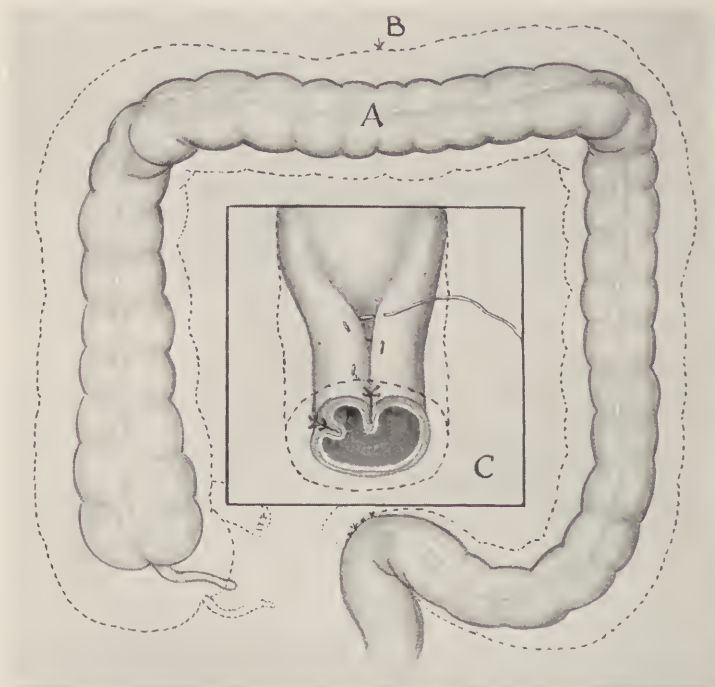


Fig. 916.—Chronic dilatation of colon responsible for constipation: *A*, Normal bowel; *B*, dilated colon; *C*, author's method of plicating and restoring the intestine to its normal size.

normal condition. *Colectomy* (Fig. 936) is indicated when colonic function is permanently destroyed.

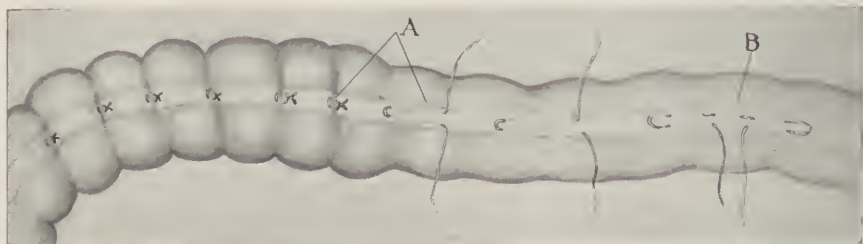


Fig. 917.—Methods of shortening an elongated atonic colon: *A*, Author's; *B*, Hazen's.

Following ileosigmoidostomy the evacuations occur regularly, auto-intoxication manifestations quickly subside, contraction of the

colon gradually ensues, pot-belly disappears, and the abdomen assumes normal size (Fig. 933, *A*, *B*; see Chapter LXXXIX).

Benign and malignant growths occluding from within or compressing the bowel from without are *extirpated* if operable, but when the patient cannot withstand resection the obstructed colonic segment is *excluded* by ceco- or ileosigmoidostomy or formation of an *artificial anus* after the author's plan elsewhere described.

Strictures (Fig. 871), however caused, inducing partial or complete obstruction, colonic stasis, and auto-intoxication, are surgically treated in the same manner as new growths.

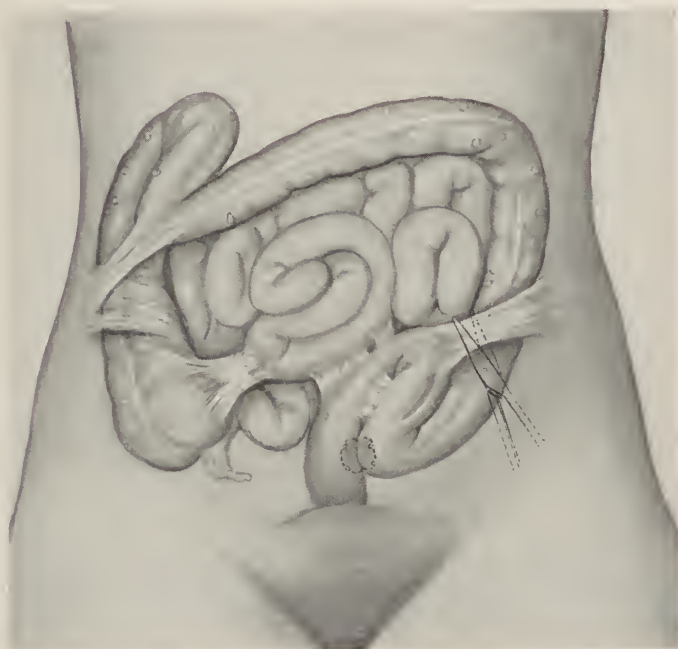


Fig. 918.—Pericolitis: Angulation of the sigmoid flexure and torsion of the ascending colon and cecum induced by membranous adhesions complicating polyposis with ulceration. Showing division of adhesion with scissors and rectosigmoidostomy made with Murphy's button.

Pericolitis and perisigmoiditis (Fig. 918), being caused in a variety of ways, require individual treatment in different cases in addition to liberating the immobilized bowel by dividing adhesions, peeling off Jackson's membrane, and separating agglutinated surfaces (Figs. 918, 919), it is necessary to correct ptosis, inflammatory and suppurative processes, straighten out angulations and twists, remove tumors that irritate, pull upon or compress the bowel, and heal chronic inflammatory and ulcerative lesions in the colonic mucosa.

Irrespective of the cause, when operating for the relief of pericolicitis and perisigmoiditis, the author nearly always performs *appendicostomy* (Fig. 1019) or *cecostomy* (Fig. 994), which is subsequently followed by through-and-through medicated irrigation to rapidly clear the bowel, hasten elimination of toxins, and cure associated catarrhal or specific colitis. Only in deplorable cases does he resort to *resection*, *short-circuiting*, or *colostomy* (Figs. 1034-1059).

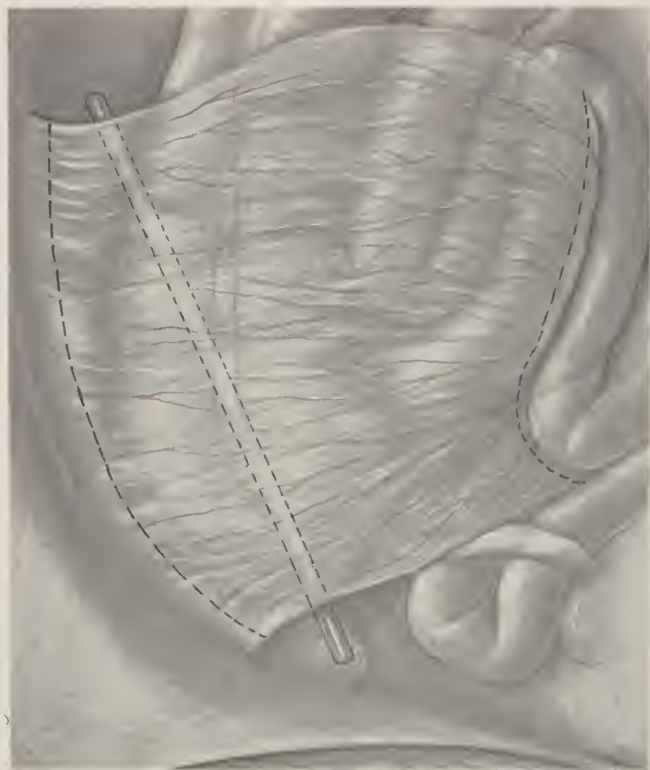


Fig. 919.—Parietocolic web-like membrane—Jackson's—extending from right abdominal wall across cecum, ascending colon, and lower ileum to its attachment at the posterior abdominal parietes. A glass rod has been introduced beneath the sheath. Dotted lines indicate incisions made preliminary to peeling membrane from the bowel.

Jackson's membranes (Figs. 919, 921) are eradicated by dividing them on either side of the cecum or colon when slight, and by peeling them from the bowel when broad, after ligating and severing their extremities (Fig. 920 *A, B*); the operation is completed by arresting bleeding with hot compresses and plicating if dilated, or anchoring the cecum to the parietes when angulated or displaced (Fig. 910).

Diverticulitis (Figs. 788, 789) alone or in conjunction with peridiverticulitis frequently causes marked obstruction—usually at the sigmoid flexure—is accompanied by septic manifestations and localized swelling, sensitiveness, muscular rigidity, and periodic discharge of pus through the bowel or bladder when an abscess has formed.

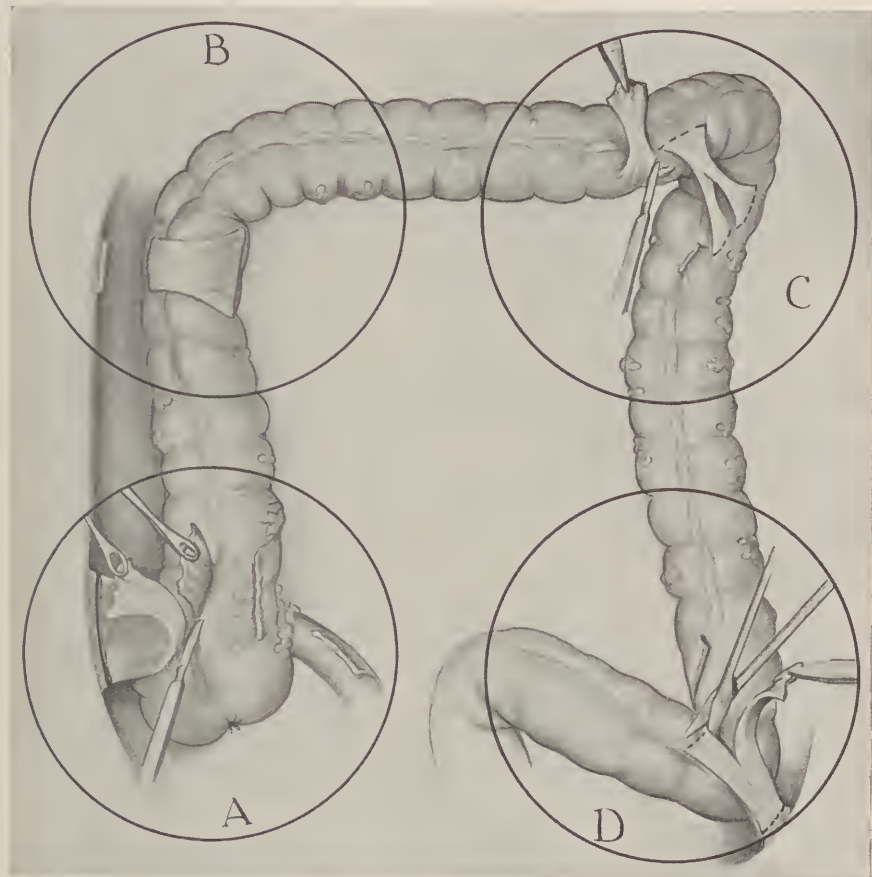


Fig. 920.—Jackson's membranes involving the ileum, cecum, and ascending colon, and thick, broad, fibrous, band-like adhesions angulating the splenic and sigmoid flexures: *A*, Membranes divided, lifted upward, and being peeled from the bowel. *B*, Membrane, divided on either side, left attached to the bowel. *C*, Method of dividing and removing adhesions with forceps and knife. *D*, Severed adhesions being dissected from the sigmoid flexure with scissors.

Palliative measures relieve symptoms, but surgical intervention is necessary for a cure.

Following exposure of the involved bowel through an ample, median, or rectus incision, the sac, if not too large, or diverticulæ are ligated, excised, and stumps are cauterized, inverted, or buried

by infolding or purse-string sutures as in appendectomy (Fig. 801). Pouches having a broad or thickened attachment may be excised by elliptic incisions (Fig. 802) and the wound closed with through-and-through sutures reinforced by continuous or interrupted Lembert stitches.



Fig. 921.—Jackson's membrane causing Lane's kink. Dots show lines of incision made when removing membrane and freeing gut.

Connecting abscesses are incised, cleansed, curetted, and drained, following which connecting openings in the bowel or bladder are sutured (Fig. 804) and covered by peritoneum or adja-

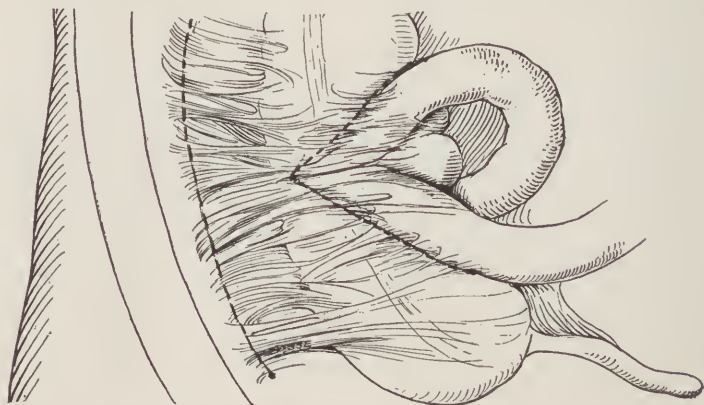


Fig. 922.—Jackson's membrane compressing and causing dilatation of the cecum and sharp kinking of ileum. Dotted lines indicate lines of incision made in separating membrane from the intestine.

cent organ. Resection or short-circuiting of the distorted gut has been resorted to in extreme cases and colostomy has been performed where diverticula induce acute obstruction and the patient cannot withstand radical operation.

Enterospasm (Fig. 948), accompanied by marked retention of gas and feces secondary to operation, induced by inflammatory or ulcerative adhesions or polyps, is usually relieved by hot fomentations, warm enemata, water drinking, fluid diet, and administration of belladonna, gr. $\frac{1}{4}$ (0.016), to quiet muscular contractions, and morphin, gr. $\frac{1}{8}$ (0.008), to allay pain.

When medical treatment fails and obstruction continues for days, the abdomen must be opened, and the cause of the irritation removed or the involved gut resected when gangrenous.

Foreign bodies and **enteroliths** inducing spastic constipation or obstruction are gotten rid of when high by repeated doses of castor oil and copious enemata, but when in the sigmoid flexure, unless large and encysted, they are removed through the sigmoidoscope, with the author's forceps (Fig. 682) designed for the purpose. When these measures fail the body or enterolith is extracted through an incision made in the bowel, enterotomy, or colotomy.

Helminths, usually tape- or lumbricoid worms (Figs. 736, 746), causing irritation or obstruction (Figs. 749, 750) that cannot be dislodged by medication reinforced by high injections are removed through a slit in the bowel, and when they have caused perforation the rent is repaired by circular infolding sutures.

Hypertrophy of O'Beirne's sphincter—rectosigmoidal juncture—a frequent cause of stasis, is sometimes overcome by soothing treatment above recommended for enterospasm and high hot medicated irrigations that heal inflammatory and ulcerative lesions, soothe the bowel, and wash out irritating substances; when due to abdominal or rectal disease it must be eliminated, otherwise constriction will continue. The author was compelled to resect this segment of gut because of prolonged muscular spasm induced by a chicken bone caught in the gut.

Operations.—When *colopexy*, *sigmoidopexy*, *coloplication*, *straightening kinks*, *severing adhesions*, *removing Jackson's membrane*, and other *conservative procedures* are not feasible, the obstructed bowel must be brought to the surface and opened—*enterostomy*, *colostomy*—*resected*, or *short-circuited* by one of the procedures enumerated and described below:

1. Entero-anastomosis.
2. Enterectomy.
3. Colectomy.
4. Proctectomy.
5. Enterostomy.
6. Colostomy.

Entero-anastomosis (Intestinal Exclusion).—Short-circuiting or diverting the fecal current from a particular segment of gut is a useful procedure in aggravated obstipation where obstruction cannot be relieved by more conservative measures and where resection is not advisable because of the patient's dangerous condition or inoperable nature of the occlusion. Any segment of the intestine or entire colon may be *shut off* by anastomosing a portion of intestine above with that below the obstruction with or without dividing and closing one end of the gut, usually, however, the ileum or cecum are joined to the sigmoid flexure—ileosigmoidostomy.

The author has performed intestinal exclusion 33 times—*entero-anastomosis* 15, *unilateral exclusion* 11, *bilateral exclusion* 7—with a mortality of 5 per cent. for entero-anastomosis, 10 per cent. for unilateral exclusion, and 15 per cent. for bilateral exclusion.

Except in a few cases of extensive ulcerative colitis operations were performed for the relief of chronic obstructive lesions, causing obstipation, stasis, and auto-intoxication. In nearly all cases the block occurred at the ileocecal valve or in the lower ileum, colon, sigmoid flexure, or rectum, and in some a single segment was excluded and in others the entire colon was short-circuited. These operations are seldom applicable in rectal obstruction and benefit the patient but temporarily when occlusion is due to inoperable malignancy.

When the colon is excluded by *ileosigmoidostomy* or *ileorectostomy* relief is immediate, and thereafter patients pass several fluid or semisolid movements daily, which gradually decrease in number until eventually they have only one, since the ileum slowly assumes colonic function.

Disuse of the large intestine is harmless, since it refunctionalizes when normal relations of the intestine have been re-established, as proved by several cases of the author's.

Intestinal exclusion brings quick, but not always lasting relief, because of subsequent contraction at the anastomotic opening, postoperative adhesions, and regurgitation encountered in some cases; to forestall or minimize the latter the author provides for drainage and irrigation by *appendicostomy* or *cecostomy* and prohibits the backing up of mucus and feces by his angulation operation (Fig. 1009). Bowel ends following cauterization are immediately inverted and closed or temporarily left in clamps.

Anastomosis may be end-to-end, lateral, or end-to-side (Figs. 1057–1064), but in either case the communicating opening is made large to allow for subsequent contraction. Different ways of draining and preventing stagnation in the obstructed bowel are

shown in Fig. 1071. Through-and-through reinforced by Lembert sutures are preferable, and Murphy's button is not employed except in urgent cases.

The author prefers *ileosigmoidostomy* to *cecosigmoidostomy*—because of the difficulty of mobilizing and bringing the right colon over to the left side, and in most instances has severed and closed the ileum at a point 6 inches above the ileocecal valve (Fig. 1057).

Hypodermoclysis is not employed unless the patient exhibits signs of shock or collapse. For a further study of the indications and technic of entero-anastomosis and intestinal exclusion, and the author's statistics of these procedures, the reader is referred to Chapter XCV.

Enterectomy.—Resection of the small intestine (Figs. 971, 974) is seldom required in the treatment of kinks, adhesions, and twists of the bowel inducing chronic obstipation, but is always indicated in cases of marked obstruction caused by tubercular, syphilitic, and other cicatricial tissue strictures, cancerous tumors, and when the small bowel is necrotic, due to strangulation by Meckel's diverticulum, pressure, or being caught in a hernial opening. In the presence of acute obstruction it is safer to open and drain the gut, postponing excision of the obstructing lesion until the patient is better able to withstand prolonged operation. The mortality is about the same, whether a few inches or several feet of the bowel is resected.

Colectomy, Cecectomy, and Sigmoidectomy.—The author rarely performs colectomy or sigmoidectomy (Figs. 967, 971, Chapter XCII) in the treatment of obstipation—stasis—and auto-intoxication, and does not believe the procedure justifiable *except when the functioning power of the colon is permanently destroyed* by chronic ulceration, polyposis, malignancy, or extra-intestinal lesions that seriously distort the bowel.

Lane and his followers frequently perform colectomy for intestinal stasis, and from witnessing these operations, observing cases treated in this way by others, together with his own experience with the procedure, the author believes colectomy is almost never indicated in this class of cases, which usually can be relieved by conservative surgery indicated above without leaving distressing sequelæ should the patient live.

Undoubtedly many unnecessary deaths and chronic invalids have resulted from the stimulus given *colectomy* by Lane, and his *short-circuiting operation* for kinks, etc., has also received undeserved prominence.

Bainbridge's summary of 106 Lane operations—54 short

circuits and 52 colectomies performed at Guy's hospital May, 1904–October, 1913—gives an idea as to what Lane has accomplished from short-circuiting and removal of the colon for the relief of stasis with complicating disease or end-results.

OPERATIONS

Short circuits.....	54
Removal of colon.....	52
Out of these—	
2 cases of short-circuit were done for rheumatoid arthritis.	
1 for trigeminal neuralgia.	
1 for tuberculous hip.	
3 short-circuit cases returned with a diverticulum.	
3 cases of removal of the colon were done on patients suffering from exophthalmic goiter.	
4 from rheumatoid arthritis.	
After operations for removal of colon 5 cases returned suffering from adhesions and had further operations.	
After short-circuit operation 8 patients returned and had removal of the colon.	

MORTALITY

1909.	(i)	A patient, aged forty-eight, died after removal of colon ten days after the operation from sepsis.
1909.	(ii)	A patient, aged sixty-eight, died of shock after removal of large intestine for advanced carcinoma of the cecum.
1910.	(iii)	A patient, aged twenty-four, died of sepsis after removal of colon ten days after operation.
1910.	(iv)	A child, aged seven, with advanced hip-joint disease, died of peritonitis three days after a short-circuit operation had been performed; condition very bad.
1910.	(v)	A patient, aged thirty-six, died in the theater while a short-circuit operation was being done.
1911.		No death.
1912.	(vi)	A patient, aged twenty, who had a colectomy done in 1909 and did splendidly until December, 1911. In January, 1912 she returned with pain and vomiting; she was operated upon and found to be pregnant. Persistent vomiting for six days after operation, accompanied by acute pain. She aborted eight days after the operation, and died of general peritonitis the next day.
1912.	(vii)	A patient, aged forty, had removal of colon for advanced malignant growth; was almost moribund on admission; died a week after the operation of exhaustion.
1913.	(viii)	A woman, aged forty-three, had removal of colon for rheumatoid arthritis—did splendidly; joints and muscles improved, and pain very much less; died of a pulmonary embolism ten days after operation.

The mortality is not particularly high in the hands of experienced surgeons, but deaths are frequent when colectomy is performed by the novice, and in either case mortality is greater in women and elderly patients. Preliminary colostomy is unnecessary except when there is *acute obstruction* and the patient cannot withstand prolonged operation. Care must be taken to avoid injuring the ureters, vas deferens, and iliac vessels.

According to indications the abdomen may be opened in the median line or by a free left or right *rectus* incision. Following clamping of the gut mobilization of the colon is facilitated by

dividing the peritoneum on either side and ligating and severing in turn arteries supplying blood to different segments of the large intestine (Fig. 969).

After the gut has been severed ends not used in anastomosis may be inverted and closed or left in clamps until the bowel has been extirpated. The ileum may be joined with the sigmoid or rectum by end-to-end, side-to-side, or end-to-side anastomosis, using linen through-and-through reinforced Lembert sutures, but in urgent cases Murphy's button is substituted for them (Fig. 969). In either case a large opening is formed, otherwise troublesome manifestations from stricture often ensue.

A drain is unnecessary unless the peritoneal cavity has been accidentally soiled, and the author does not resort to hypodermoclysis unless the patient exhibits manifestations of shock.

Pulverized opium, gr. $\frac{1}{4}$ (0.016), and belladonna, gr. $\frac{1}{8}$ (0.008), are administered three times daily to control pain, arrest peristalsis, and diminish enterospasm, and the patient is kept on a fluid diet for a week or ten days following operation.

Complete discussion of the *technic* of *colectomy*, *sigmoidectomy*, and *proctectomy* has been omitted here, since it has been fully given in connection with colonic resection and proctectomy for cancer involving the ileocolic angle, colon, rectum, and anus described in Chapters LVII, LVIII, XCII.

Enterostomy.—This procedure is seldom employed because chronic obstructing lesions are rare in the small intestine, and enterostomy is objectionable when they block the ileocecal angle or lower ileum, since fluid feces escape frequently through the opening to keep surrounding skin constantly irritated (Fig. 1022).

Colostomy.—The colon may be opened at any point to relieve chronic obstipation, but the formation of an artificial anus is contraindicated except when the obstructing lesion is inoperable and located at the lower sigmoid, rectosigmoidal juncture, or rectum. When the block is higher and cannot be corrected or removed entero-anastomosis (ileosigmoidostomy or ileoproctostomy) is preferable to colostomy, for it relieves obstruction, enables the patient to have daily soft evacuations, and has not the inconvenience and objectionable features of an artificial anus. For the *technic* of enterostomy and colostomy see Chapter XCIV. When the patient has fully recovered the opening may be closed and bowel function restored after the plan described in Chapter XCVI.

Surgical Treatment of Anorectal Constipation.—Congenital anomalies of the rectum and anus may be difficult or impossible to correct, and when occlusion is complete or nearly so death occurs

in a few days unless a vent is quickly made for the escape of meconium and feces.

Narrowing of the lower rectum is overcome by splitting the anal canal or divulsion with finger or bougie.

Membranes, fibrous bands, and skin folds partially or completely blocking the anus are divided or trimmed off with scissors followed by introduction of an anal dilator (Fig. 923) or the oiled finger into the bowel occasionally to prevent stricture forming.

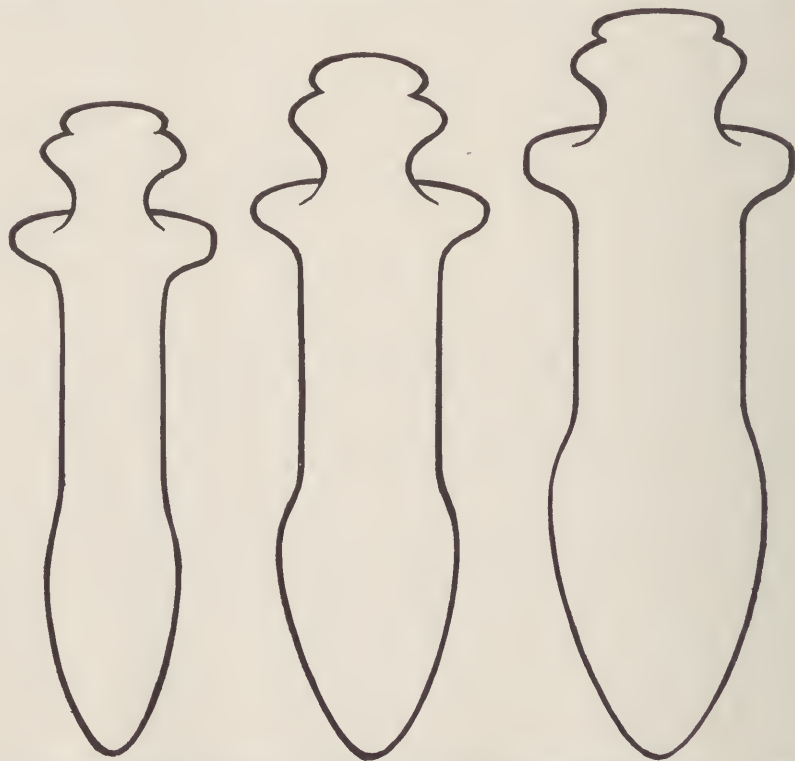


Fig. 923.—Self-retaining anal dilators (actual size) occasionally employed in gradual divulsion of the sphincter or narrow anal canal responsible for constipation and recurring fecal impaction.

Imperforate anus with blind rectum (Fig. 134) requires careful operating, since the bowel may terminate near or distant to the anus, and caution must be exercised to preserve the sphincter when present. Through an anteroposterior incision made at the anal site the *culdesac* is freed, brought down, opened, irrigated, dried, drawn through the sphincter—if present—and sutured to the skin. When high the blind rectum is pulled down as far as possible, anchored, opened, and a drainage-tube inserted, and the finger

occasionally introduced subsequently to prevent closure of the opening, but when neither of these procedures is feasible colostomy is performed to relieve obstruction.

Imperforate anus with fecal fistula if incomplete and the bowel empties fairly well may be left for years until the child can stand radical operation necessary to restore the bowel and close the opening communicating with the vagina, bladder, urethra, or skin; but in urgent cases the *culdesac* is liberated and attached to the perianal skin, which is usually followed by spontaneous cure of the fistula; or an artificial anus is established when occlusion is complete and permanent.

Imperforate rectum with an apparently normal anus (Fig. 134) is seldom suspected prior to dangerous obstructive manifestations, yet the condition is readily diagnosed with the finger and quickly relieved by puncturing with a trocar or incising the *culdesac* and occasionally dilating the opening; later the anal canal may be denuded and mucous membranes of the rectum loosened, drawn down, and sutured at the anus.

Obliteration of the rectum or colonic segment in rare instances may be corrected by finding opening, bringing down and stitching the blind gut at or near the anus; but in most cases it is advisable to open the abdomen and form a permanent artificial anus by suturing the sigmoid or colon in the wound. When obstruction is acute immediate drainage is indicated, otherwise the bowel is not opened for a few days to permit it to become agglutinated to its surroundings, thereby diminishing danger from infection.

For a detailed description of this class of operations see Chapter II, Vol. I.

Extrarectal pressure causing stasis is overcome by correcting uterine procidentia or displacement, reducing prostatic enlargement, opening and draining chronic abscesses, extirpating sacral and other tumors, and excising the coccyx when it encroaches upon the bowel.

Diverticulitis here is different from that involving the sigmoid, since sacs are usually infected, making excision difficult or impossible. In the majority of the author's cases a cure has been effected by incising and draining them, or connected abscesses by incisions made from within or without the bowel.

Helminths—tape-, lumbricoid, and pin- or thread-worms (Fig. 754)—aggravating constipation by inciting the levator ani muscles to spasmodic contraction, are destroyed by vermifuges, medicated enemata, or removing them through the proctoscope (see Chapter LXXI).

Strictures within 3 inches of the anus may be kept open through *divulsion* with dilator (Fig. 923), bougie, or fingers; or the caliber of the bowel increased by splitting the rectum—proctotomy (Fig. 505)—and subsequent dilatation, but these procedures are not safe for constrictions above the peritoneal attachment. Cicatricial—high or low—strictures cannot be permanently eradicated except by *extirpation*, which necessitates rectal, abdominal, or combined excision according to location and extent of the occlusion (see Chapters XCII, XCVI).

Malignant and large benign growths inducing mechanical stasis must be removed; if low, by *proctectomy*, and high, by *sigmoidectomy* or combined rectal and abdominal operation.

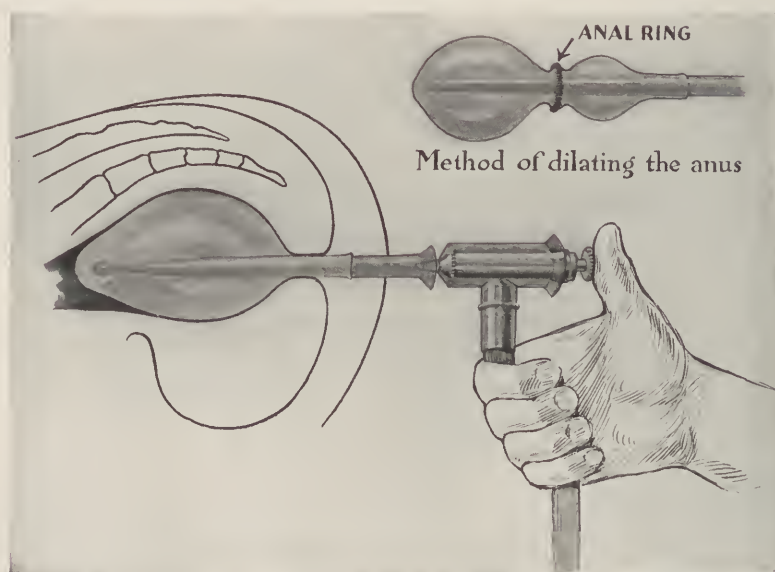


Fig. 924.—Technic of dilating the rectum with Hirschmann's dilator.

Single or multiple polyps (Fig. 868) in the lower sigmoid, rectum, or at the anus may be removed through the proctoscope by fulgurating or attaching pressure forceps or a Gant valve clamp to their pedicles, which cause them to drop off (Fig. 926), or when near the anus by excision and sutures, ligation or crushing, and snipping them off with scissors (Figs. 543, 555).

Abscesses and fistulæ causing induration and thickening and occlusion of the rectum are freely incised, cureted, drained, and permitted to heal by granulation.

Hypertrophied rectal valves obstructing the rectum are eliminated by dividing them through the center with Gant's valve

clamps which cut through by pressure necrosis (Figs. 925, 926, 927).

Procidencia recti varies in degree and different operations are required for its cure, the principles of which consist in shortening



Fig. 925.—Appearance of Houston's valves as seen through the proctoscope following recta inflation.

and diminishing caliber of the rectum, setting up an inflammatory process to agglutinate rectal tunics, tightening the relaxed sphincter, and in aggravated cases performing sigmoidopexy.

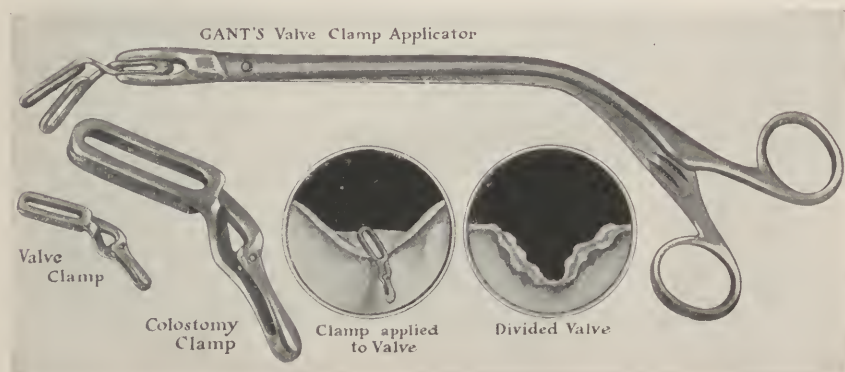


Fig. 926.—Author's valvotomy instruments. Below is shown appearance of the clamp through the proctoscope applied, and ulcerated edges of the valve after it has cut its way out.

Foreign bodies and **enteroliths** are removed through the proctoscope or anoscope with the author's special forceps—when small, splitting the anal canal—or sphincteric divulsion—when large or irregularly shaped, and by dissection if encysted.

Hypertrophy of the levator ani muscle inducing stasis through

closing the lower rectum is relieved by a 3-inch median incision made through the posterior rectal wall splitting the muscle, and out through the skin, which facilitates drainage.

Narrowing—cicatricial or muscular—of the anal canal accompanied by painful defecation and fecal retention is occasionally cured by simple or forcible divulsion, but more lasting and satisfactory results are obtained through splitting the lower rectum posteriorly (Fig. 199).

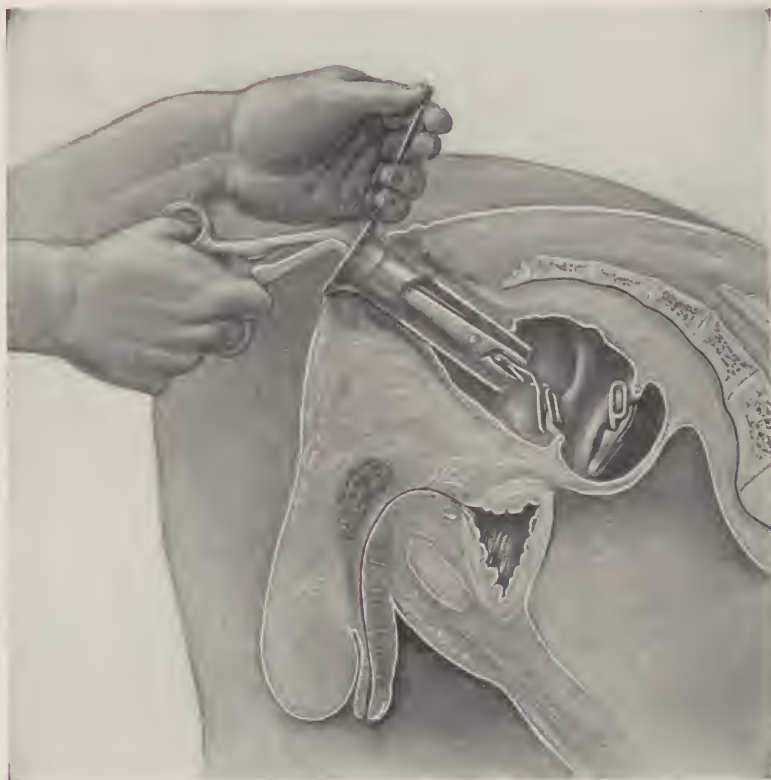


Fig. 927.—Technic of the author's clamp valvotomy.

Hypertrophy of the sphincter ani characterized by spasms of the muscle is corrected by thorough divulsion or preferably division of the sphincter under infiltration anesthesia (Fig. 199).

Deviation of the coccyx indenting the rectum is permanently overcome by the author's three-minute coccygectomy described elsewhere.

Proctitis and periproctitis, causing muscular irritability and constipation, usually respond to a 2-per cent. ichthyol or balsam of

Peru irrigation employed twice daily through a two-way irrigator and stronger applications applied to ulcerated areas, but when colon and rectum are extensively involved by ulceration, *appendicostomy* or *cecostomy* and through-and-through colonic flushing are indicated.

Fissures and **ulcers** located near the anus, causing sphincter-algia and incomplete evacuations, necessitate stretching or dividing the anal muscle (Fig. 199) and topical applications.

Hypertrophied anal papillæ are painlessly excised with scissors following infiltration of their base with $\frac{1}{8}$ per cent. eucain.

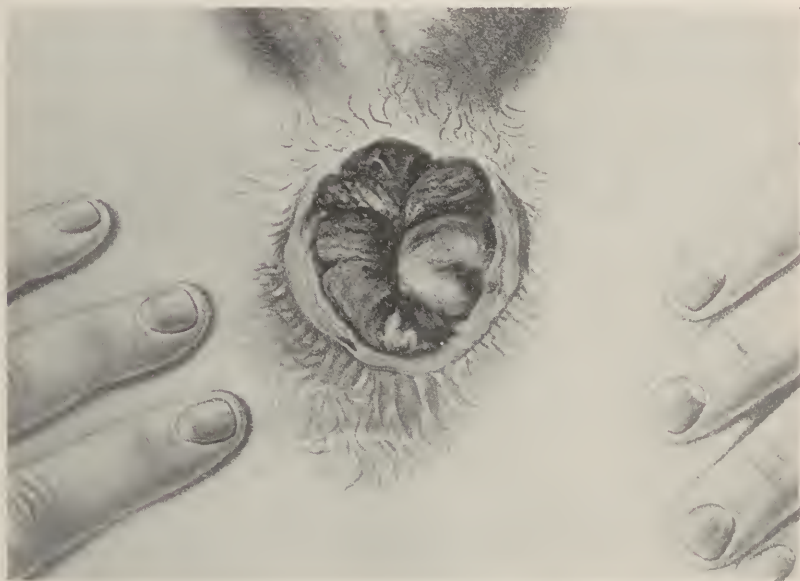


Fig. 928.—Protruding internal hemorrhoids with prolapsed mucosa.

Cryptitis is cured by hooking up and removing inflamed crypts.

Fecal impactions are gotten rid of by oil or soapsuds injections when moderate and feces are soft, and by removing them with the fingers or breaking them up with a spoon or fingers, followed by irrigation, when masses are large and firm, but in extreme cases, where inspissated feces completely fill the rectum, divulsion or division of the sphincter precedes the above measures to facilitate their evacuation.

Hemorrhoids (Fig. 928) causing constipation by blocking the lower rectum or sphincter-algia are removed under local anesthesia by the ligature method described and illustrated in Chapter XXXIII.

Chapter LXXXIX

Congenital—Idiopathic—Dilatation of the Colon and Sigmoid Flexure (Hirschsprung's Disease, Colonic Hypertrophy, Congenital Megacolon)

CONGENITAL idiopathic dilatation of the colon was first discussed by Bright (1838), who reported a case, but colonic *gigantism* did not receive merited attention prior to Hirschsprung's classic description of the condition. Formerly it was believed that congenital megacolon was confined to the sigmoid flexure, but we now know that a *section of or the entire large bowel* may be enormously dilated and elongated at birth, and that the distortion may be augmented as the child grows older (Fig. 929).

ETIOPATHOLOGY

Hirschsprung's disease is unlike other congenital malformations of the bowel in that it is seldom if ever associated with anomalies elsewhere; this condition is encountered more frequently than *microcolon*, or contraction and narrowing of the large gut.

Congenital megacolon has been confused with *acquired* dilatation of the large intestine in children suffering from congenital defects involving the gut, as stenosis, valve-like occlusions, torsion of the mesentery, and imperforate rectum or anus. Magoun, of The Mayo Foundation, classifies dilatation of the colon simulating Hirschsprung's disease as follows:

1. The congenital type or true Hirschsprung's disease, (*a*) cases occurring in infancy or early life, (*b*) cases in which obstinate constipation, abdominal distention, and emaciation have been present from birth, but the patient has grown to adult life.

2. Cases in which chronic constipation has been present for years, and in which symptoms of Hirschsprung's disease developed, within a short period, without demonstrable mechanical obstruction (large fecaliths are usually present).

3. Cases of megacolon which are due to definite mechanical obstruction, such as (*a*) those occurring in infancy, due to atresia or stenosis of the rectum, (*b*) those occurring in adult life, due to tumors, volvulus, adhesions, pressure from without the bowel, or inflammatory stenosis.

Hirschsprung's disease is more common than supposed, which is evidenced by Schneiderhühn's 358 collected cases. Finney reported 11 cases treated at Johns Hopkins Hospital, and doubtless there are hundreds of unpublished cases, for nearly every surgeon with whom the author has discussed the condition has claimed to have treated one or more children thus afflicted.



Fig. 929.—Radiograph of Hirschsprung's disease—congenitally dilated colon. Note water-barium line extending across abdomen and enormous size of the descending colon and sigmoid flexure. (Author's case.)

Altogether but 8 cases of genuine Hirschsprung's disease have come under the author's observation, concerning 5 males and 3 females; 2 patients were less than one year old, 1 was three, 1 ten, 1 eighteen, 2 twenty, and 1 thirty years of age. Abdominal distention was a prominent feature in all; some had partial, and others

complete megacolon that caused a radical change in the topography of the large intestine. The most salient symptoms consisted of obstipation, recurrent coprostasis, abdominal bloating, moderate vomiting, anemia, malnutrition, gastric disturbances, gas-pains, cardiac palpitation, simple or ulcerative colitis; some patients had marked auto-intoxication, while others had become *immune* and exhibited no signs of toxemia, the result of chronic fecal retention.

Usually other malformations of the bowel terminate fatally shortly after birth, but congenital dilatation of the colon rarely causes death in the early months of life, but induces constipation and obstructive manifestations that gradually become aggravated until an operation is imperative to prolong life.

The accompanying table arranged by Mummery gives an idea of the frequency with which congenital megacolon is encountered in various stages of life, and the relative frequency with which Hirschsprung's disease involves individual segments or the entire colon and rectum:

Ages.	Number of cases
Under 5.....	24
5 to 10.....	16
10 to 20.....	14
20 to 30.....	11
30 to 40.....	7
40 to 50.....	8
50 to 60.....	5
60 to 70.....	6
Over 70.....	4
Not stated.....	5
Total.....	100

PARTS OF COLON AFFECTED	
Sigmoid.....	51
Whole colon.....	20
Hepatic flexure to rectum.....	11
Hepatic flexure to sigmoid.....	1
Splenic flexure to rectum.....	2
Cecum to splenic flexure.....	4
Transverse colon.....	2
Descending colon.....	1
Not stated.....	8
Total.....	100

The compiler of the above 100 cases states that while the sigmoid alone was directly affected in 51, it was also involved with other segments of the colon in 33 other instances (84 in 100), which like the statistics of other investigators show that congenital dilatation occurs in the sigmoid flexure more frequently than in all other parts of the colon.

During infancy and childhood, when the colon is dilated

and hypertrophied, the condition is congenital in 75 or larger per cent. of the cases; in the remainder colonic distortion is traceable to other congenital anomalies of the intestine, or lesions formed after birth that cause obstruction, dilatation of the bowel, and abdominal distention.

In Mummery's collected cases (100) colonic dilatation was congenital in 74, and in the remainder it was caused or complicated by the different types of obstruction mentioned in the accompanying table:

Causes of obstruction.	Cases.
Congenital stricture of the rectum.....	11
Chronic volvulus of the sigmoid flexure.....	7
Angulation.....	2
Slight rectal narrowing.....	2
Congenital stricture of the sigmoid flexure.....	1
No obstruction found.....	77
Total.....	100

Appearance of the Bowel.—In typical cases of congenital colonic dilatation the intestine varies from two to five times its normal size

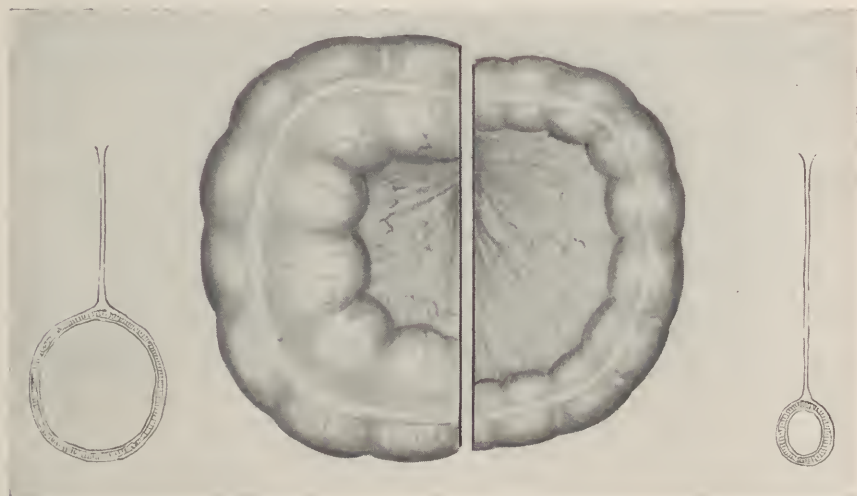


Fig. 930.—Hirschsprung's disease: Left, Enormously dilated colon with its shortened mesentery. Right, Normal large intestine and mesentery.

(Fig. 931), and in some instances it or the involved segment is considerably lengthened beyond its usual dimensions. Under such circumstances the gut tightly distends the abdomen, is encountered in unusual locations, the characteristic markings of the colon are unrecognizable, its mesentery is abnormal in appearance (Fig. 930),

and in 2 instances the author mistook the large bowel for an enormously enlarged stomach because of the arrangement of vessels.

Colonic distention is not relieved by cathartics or high injections, and it is often difficult or impossible to restore the gut to the abdomen following evisceration. In 3 of the author's cases the intestine was of a dark reddish-brown (liver) color, three times its normal thickness, indurated but not brittle, had a long mesentery characterized by numerous enormously dilated vessels, and the bowel had apparently broken loose from or stretched its attachments,

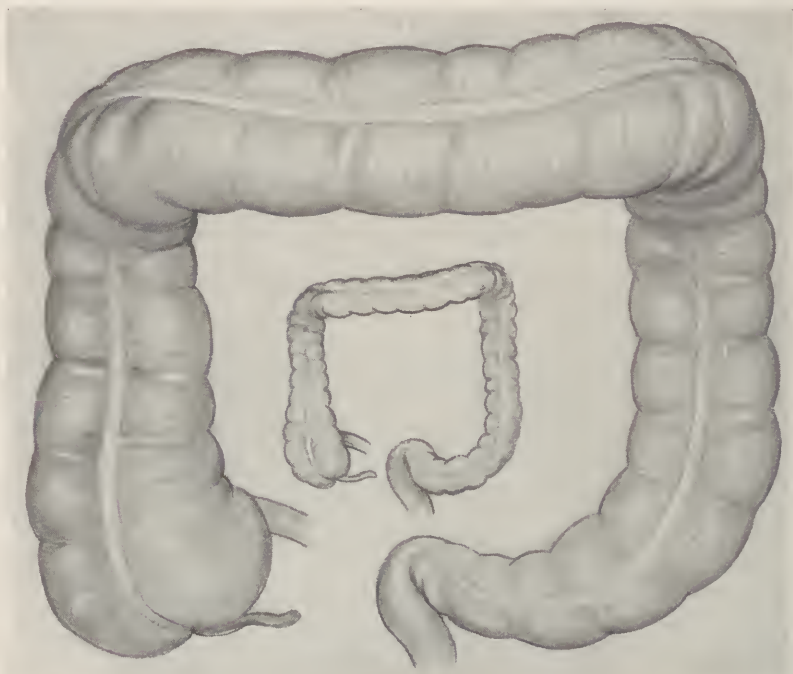


Fig. 931.—Hirschsprung's disease: Comparative size of a normal and congenitally dilated colon treated by the author (Fig. 933).

since it was not difficult to mobilize the gut after lengthening the incision.

Autopsy findings have demonstrated that the mucosa participates but slightly in the hypertrophic process (Fig. 932). In one of the author's cases of congenital dilatation involving the sigmoid flexure and descending colon a segment of the former, cocoon in size, was markedly thinned and sacculated and stercoral ulcers were visible through the serosa. The patient constantly suffered from fecal impaction since her bowels acted not more than once

or twice monthly, when enormous quantities of feces were discharged following repeated catharsis reinforced by high ox-gall, oil, or soapsuds enemata.

Congenital colonic dilatation may terminate abruptly, be funnel-shaped at either extremity, or the gut may gradually taper down to its normal size; in a case observed by the author the cecum and sigmoid flexure were enormous, while the transverse and descending colons were but slightly enlarged. Perforation from



Fig. 932.—Hirschsprung's disease: Photograph of mucous surface of bowel in Carpenter's case of congenital dilation of the colon—Hirschsprung's disease—published by Mummery.

ulceration and sloughing of the gut from distention have been observed, but peritonitis has never been encountered by the author.

SYMPTOMS

Manifestations of *acute ileus* are rare, while symptoms of *chronic intestinal obstruction* are always present in infants, children, and adults who suffer from obstipation arising from congenital dilatation and hypertrophy of the colon.

Briefly summarized, the characteristic symptoms of Hirsch-

sprung's disease are persistent constipation, complicated by fecal impaction and stercoral diarrhea, gas distention, colonic soreness or colic, absence of gas and feces in the rectum, nausea or vomiting, peristaltic activity in the dilated segment of the gut, pot-belly (Fig. 933, *A*), malnutrition, digestive disturbances, labored respirations, irregular pulse, sallow complexion, bulging chest, and irregular slight temperature.

When Hirschsprung's disease is troublesome from birth, meconium is gradually discharged for several days, and evacuations are procured with great difficulty. Older children and adults have



Fig. 933.—Congenital dilatation of the colon (Hirschsprung's disease) in a boy cured by the author: *A*, Appearance of abdomen before ileosigmoidostomy; *B*, appearance of abdomen two months after ileosigmoidostomy. The patient, now a man, is still living comfortably fifteen years following operation.

periodic evacuations which are copious; the author treated a girl of eighteen who said she never had more than two evacuations yearly, once in six months; at the time of examination she claimed her bowel had not acted for three months, and though she was placed in the hands of a nurse and prodigious efforts were made to empty the intestine, the author was unable to secure a movement until *six weeks* later, when she had several actions within twenty-four hours and evacuated an enormous quantity of scybala, semi-solid, and finally fluid feces having an offensive odor. The patient was hysteric, but did not complain of pain or exhibit manifesta-

tions of intestinal *auto-intoxication*, though her abdomen was so tightly distended that overlying skin was thin and glistening.

DIAGNOSIS

With a history from birth of marked gas distention, obstipation with periodic evacuations, digestive disturbances, manifestations



Fig. 934.—Hirschsprung's disease: Congenitally dilated colon that entirely filled the abdomen. Note enormous size of the cecum, ascending and transverse colons, and that the descending colon and rectum are distended with air introduced per anum. The author cured this patient (Fig. 933) by ileosigmoidostomy.

of auto-intoxication, and a protruding abdomen (Fig. 933, A) one is justified in making a tentative diagnosis of Hirschsprung's disease,

whether the patient be an infant, child, or adult, provided the rectum is not obstructed.

Occasionally a diagnosis is quickly made with a sigmoidoscope, as the ballooned gut can be readily inspected when the lower sigmoid is involved; but if the colon proper is dilated, fluoroscoped, or radiographed following the administration of a barium meal or enema, the fluoroscope enables one to observe accompanying movements, and radiographs show the size and location of the dilated bowel (Fig. 934). Sometimes an accurate diagnosis is impossible before the abdomen is opened and the colon examined.

TREATMENT

When the colon is enormously elongated and enlarged, marked obstipation and auto-intoxication prevails whether the condition is congenital or acquired. Treatment in this class of cases is *non-operative* and *surgical*, and must be varied to meet indications.

Non-operative Treatment.—Regulating the diet, faradization, vibratory and friction massage reinforced by laxatives and copious high ox-gall, oil, and soapsuds enemata procure daily evacuations and relieve the patient from distress, but accomplish little or nothing toward a cure.

Occasionally liberal doses of strong laxatives and cathartics are not effective, and a large quantity of fecal matter collects in the dilated, sagging colon, and it dries out to form scybala or putty-like masses difficult to evacuate. The author employs weekly doses of castor oil and daily administration of salts or other hydragogues to forestall fecal impaction when liberal doses of olive, mineral, or other lubricating oil fail to procure coveted movements.

Once the colon has become packed with a *sausage-shaped* fecal accumulation physical measures—laxatives and hydrotherapy—are temporarily abandoned for frequent high oil, soapsuds, or hydrogen peroxid—25 per cent.—injections, of which the latter is the most reliable because it deoxidizes the impacted mass into smaller particles that are readily evacuated with copious colonic lavage. Occasionally heavy massage helps to dislodge scybala in connection with laxatives and enemata, but when there are indications of stercoral ulcers or manipulation of the colon is painful, massage is discontinued to avoid danger of rupturing the bowel.

Measures already discussed may be relied on for clearing the cecum, ascending, transverse, and descending colons of fecal accumulations; when the impaction is in the sigmoid flexure it is

broken up and washed out through the sigmoidoscope with the aid of a long-handled scoop and an effective irrigating apparatus.

Rectal impactions are removed by breaking them into small pieces with the finger, gouge, or spoon handle, and injecting 3 or 4 ounces of oil and ox-gall to soften the mass, shortly following which the patient usually has a copious evacuation. When the entire collection of feces is not expelled with the first movement, soapsuds, ox-gall, or oil enemata are administered at short intervals until the remainder has been evacuated.

Surgical Treatment.—Hirschsprung's disease—megacolon—is essentially a surgical condition, and *operative* are preferably substituted for *non-operative* measures at the first favorable opportunity in patients more than five years old.

Character of the operation selected varies in different cases, depending on the size and extent of the hypertrophied colon, ptosis of the bowel, and the presence of ulcers, adhesions, angulations, twists, or strictures. While the treatment of *acquired* is similar to that of *congenital* colonic dilatation, the mortality is lower and results are better in the former.

The following surgical procedures have been employed in the treatment of Hirschsprung's disease: (a) *tapping*, (b) *coloplication*, (c) *colopexy*, (d) *colonic exclusion*, (e) *appendicostomy*, (f) *cecostomy*, (g) *ileostomy*, (h) *colostomy*, and (i) *colectomy—resection*.

Tapping.—This procedure is dangerous, unreliable, and to be condemned, because while gas distention is relieved by puncturing the colon, feces do not escape through a trocar, and peritonitis has been known to follow the operation.

Coloplication.—Plication and replication (Fig. 910) have given good results in several instances. The author scarifies, infolds, and sutures longitudinally the bowel at the sides and opposite the mesenteric attachment until its diameter has been diminished about one-half or more. In these cases the gut is always ptotic, and to simultaneously correct this condition plicating linen sutures are left long for the purpose and carried through the abdominal wall with a handled needle (Fig. 893), and tied across rubber tubing which anchors the colon to the inner parietes—colopexy. The author's results have been much better since he began doing the combined operation instead of coloplication alone.

Colopexy.—Several operators claim to have cured megacolon by attaching the enlarged bowel to the anterior or posterior abdominal parietes, but this procedure fails to accomplish desired results unless it is combined with *coloplication*, *ileostomy*, *colostomy*, or *ileosigmoidostomy*.

Colonic Exclusion.—Short-circuiting the large intestine is the *procedure of choice* (Fig. 935) in the treatment of congenital and acquired colonic dilatation during infancy and childhood, because the operation is not very dangerous, insures daily movements, and is followed rapidly by contraction of the colon nearly or to its normal size and length.

The author has cured 5 infants, children, and adults by putting the colon at rest in this way, a marked example of which was the boy shown in Fig. 933 *A, B*.

The procedure may be employed as a curative measure or preliminary step to *colectomy* (performed by the author in one case), where excision of a segment or all the colon is necessary because of complications.

Short-circuiting may be accomplished by *cecosigmoidostomy*, *ileosigmoidostomy*, or *ileorectostomy*; the best results follow when

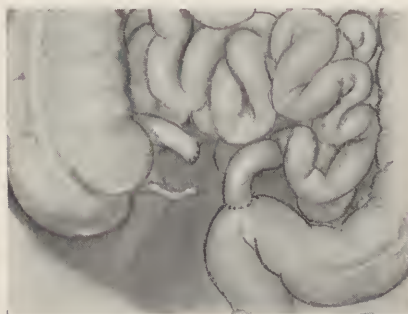


Fig. 935.—Hirschsprung's disease—congenital—dilatation of the colon. Method of curing by colonic exclusion—ileorectostomy or sigmoidostomy.

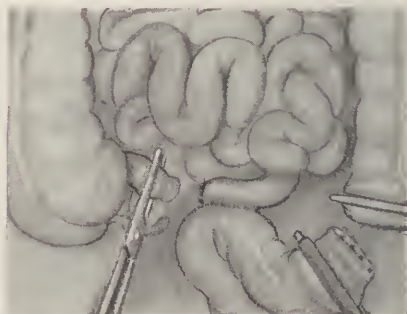


Fig. 936.—Method of curing Hirschsprung's disease by colectomy.

the union is made low down and with lateral in preference to end-to-end anastomosis.

Appendicostomy and Cecostomy.—Either of these procedures, performed alone or in conjunction with *ileosigmoidostomy* (Fig. 935) after the plans outlined in Chapter CXIII, materially aid in the treatment of megacolon because it enables the physician or nurse to flush the colon daily, which softens and evacuates feces, *débris* and toxins, and thus diminishes intestinal auto-intoxication.

Appendicostomy and cecostomy are valuable adjuncts when employed in connection with colopexy or coloplication, owing to the benefits derived from through-and-through colonic irrigation, but they are not dependable unless reinforced by other operative and therapeutic measures.

Ileostomy and proximal *colostomy* are effective in the treatment of Hirschsprung's disease because they put the bowel at rest, relieve distention, and allow the colon to collapse and later contract from non-use; the former is indicated when the entire large intestine is dilated, and the latter when a colonic segment, as the sigmoid, is involved.

These procedures possess no advantages over colonic exclusion, and are objectionable because feces voided through the artificial opening often excoriate the skin (Fig. 1022), and a secondary and more dangerous operation is required to establish continuity of the gut after colonic dilatation has been relieved or cured.

Without apparent reason the mortality from enterostomy and colostomy is higher than that of previously mentioned operations. In 2 instances the author performed *enteropexostomy* to relieve dilatation of the large bowel complicated by marked colonic ptosis. In these cases after performing *ileostomy* he anchored the colon to the anterior abdominal wall—*colopexy*.

Colectomy.—When an infant, child, or adult afflicted with Hirschsprung's disease is strong enough to withstand a prolonged operation, *resection* (Fig. 971) of all or a dilated segment of the colon is justifiable where the bowel is enormously hypertrophied, ptotic, angulated, or bound down by adhesions, and when for any reason exclusion of the dilated gut is impracticable, resection gives satisfactory functional results.

The *mortality* of colectomy in infancy and childhood is *very high*, but adults withstand the operation fairly well; hence resection ought not to be attempted in the young except in extreme cases, and not then until serious abdominal distention and obstruction have first been relieved by *appendicostomy*, *cecostomy*, *colostomy*, or *colonic exclusion*.

Following correction of dilatation in one, a new segment of the colon has been known to become hypertrophied without apparent cause.

Chapter XC

Fecal Impaction—Coprostasis

General Remarks.—Fecal impaction is the accumulation within the bowel of large, hard, oval, or nodular fecal masses, which resist natural efforts of expulsion, causing partial or complete obstruction.

Enormous collections of clay-like feces, inducing partial or complete occlusion, may be located in any portion of the large intestine. Of these, 60 per cent. are in the rectum, 15 per cent. in the sigmoid, 10 per cent. in the cecum, and the remainder in other segments of the colon. Impaction occurs more frequently in women than men, and the older the person, the more likely is he to suffer from this affection. No age is exempt, cases having been recorded in individuals from infancy to seventy years and more. This condition may be *acute* and *chronic*: acute when the mass collects in a short time, and chronic when several weeks are required.

ETIOLOGY

The etiology of fecal impaction is the same as for *constipation* and *obstipation* fully discussed in previous chapters, causes that may be classified as *medical* and *surgical*.

Coprostasis in children and adults is frequently induced by a narrow anus or congenital defect of the anus, rectum, or colon that hinders free passage of feces through the bowel. Fecal impaction is also a frequent complication of adhesions, twists, tumors, ptosis, invagination, or other rectocolonic lesions that press upon or occlude the bowel from within or without.

Constipation the result of indoor life, lack of exercise, carelessness about emptying the bowel when there is a desire to stool, gourmandizing, old age, paralysis, chronic invalidism, neurogenic and psychic disturbances is responsible for recurring coprostasis in the majority of instances.

In fact, anything that interferes with peristalsis, lessens colonic secretion, or occludes the bowel may be classed as an etiologic factor in fecal impaction or coprostasis. The author has treated several cases of chronic impaction involving the rectum and sigmoid flexure caused by bismuth accumulations (Fig. 937) when the drug had been administered in large doses for a long time.

SYMPTOMS

Symptoms vary, depending on the cause, size, consistence, and location of the impacted mass. In the beginning there is constipation alternating with diarrhea; and finally a *diarrhea* of the most annoying and persistent kind. Liquid feces are discharged



Fig. 937.—Concretions formed from dried bismuth mass that completely filled the rectum and lower sigmoid (the author's) flexure, causing obstruction and continuous watery diarrhea. Relief immediately followed removal of 3 pints of bismuth accomplished by digging the *putty-like mass* out with fingers following general narcosis and sphincteric divulsion.

around or through the fecal tumor, and the sufferer's real ailment is frequently not suspected by patient or physician. In some cases movements have a vile odor.

These sufferers are nervous, despondent, and restless; have a muddy complexion, disagreeable breath, indigestion, barking

cough, morning vomiting, cold feet, night-sweats, thirst, loss of appetite, dizziness, sometimes jaundice, albuminuria, seminal emissions, frequent micturitions, sphincteric spasm, "nipple-shaped anus," and inflamed rectal mucosa. Pain from a fecal impaction is local and interrupted when small, but becomes continuous and disseminated as it grows larger. The mass produces a sensation of weight and fulness in the rectum, frequent and prolonged straining, and bearing-down pains similar to those experienced during labor. Pain is not confined to the anal region, being frequently reflected to the abdomen, back, neighboring organs, and down the limbs caused by pressure on nerves. In persons suffering from chronic impaction and fecal toxemia the temperature is irregular, pulse small and weak, and respiration difficult. They have a troubled expression, are anemic, and occasionally collapse completely from exhaustion. There may be local or general peritonitis, ulceration, perforation, and fecaloid vomiting in extreme cases due to pressure and occlusion.

Fecal accumulations may aggravate pathologic conditions present in the rectum or produce them. The length of time one can live without defecation has been the subject of debate, and still remains in doubt. Cases have been recorded where complete occlusion from coprostasis had existed for from one week to more than six months—see table of cases. The author treated several cases due to malignant or benign stricture in persons who had not had an evacuation in from two weeks to two and three months, some of whom were fairly comfortable, and did not worry.

Coprostasis may cause *paralytic ileus*; the collected feces prevents downward peristaltic action, interferes with proper nutrition and nerves of the intestine, resulting in contraction of the bowel below the obstruction. The length of contracted gut depends largely on the extent of the impaction. Another serious and frequent sequel of large fecal chronic accumulations is *dilatation of the colon*, the bowel sometimes assuming enormous proportions. This complication is met with more frequently in cases of *recurring impaction* common to elderly persons.

Chronic constipation accompanied by impaction is always an important etiologic factor in *chlorosis*; the anemic condition is brought about as a result of a general *fecal toxemia*; hence the importance of teaching young girls to be regular in going to stool. This toxemia produces a depressing effect on the mind, and many sufferers do not take interest in business, want to remain secluded, and not a few have suicidal tendencies. In extreme cases it has been known to produce temporary *mania*, and in young children

symptoms simulating *cerebrospinal meningitis*. Cases have been recorded where auto-intoxication or infection from fecal accumulation has induced hyperemia and edema of the brain, congestion of the lungs, and acute parenchymatous degeneration of the heart, kidneys, and lungs (von Solder).

The numerous symptoms, complications, and end-results of chronic intestinal stasis discussed at length in Gant's *Constipation, Obstipation, and Intestinal Stasis*, p. 560, 1916 are frequently associated with chronic fecal impaction the result of medical or surgical causes.

DIAGNOSIS

Diagnosis of fecal impaction is less difficult to diagnose than other varieties of intestinal occlusion, yet the task is not always



Fig. 938.—Chronic fecal impaction the result of angulation at the rectosigmoidal juncture, showing the sigmoid flexure packed with scybala and the rectum filled with a larger putty-like mass.

an easy one. It is true that when a hard, large fecal mass uncovered by mucous membrane is situated in the lower sigmoid flexure or rectum (Fig. 938) digital examination quickly reveals its nature. On the other hand, when the mass is partially covered by mucosa or located in the sigmoid flexure or colon (Fig. 939) it is often perplexing to make a positive diagnosis. It must be

borne in mind that tumors of the intestine, bladder, vagina, uterus, tubes, ovaries, and prostate sometimes cause intestinal occlusion, and a long train of symptoms similar to those induced by coprostasis. When the accumulation is in the rectum it is frequently mistaken by the inexperienced finger for carcinoma, because the

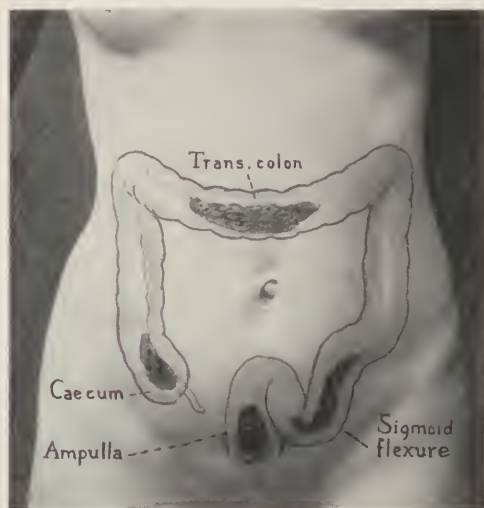


Fig. 939.—Schematic drawing showing most frequent locations of fecal impaction encountered in the colon, sigmoid flexure, and rectum as they are met with from below upward.

mass pushes the mucous membrane down in front of it, giving to the touch a sensation similar to that of cancer.

The following points should be observed when differentiating between these two conditions:

DIFFERENTIAL DIAGNOSIS BETWEEN FECAL IMPACTION AND CARCINOMA OF THE LARGE INTESTINE AND RECTUM

FECAL IMPACTION	CARCINOMA
1. Single, large, firm, and globular in shape; or numerous, small, hard, and nodular.	One or more dense rounded tumors.
2. Usually not covered by mucous membrane.	Covered by mucosa except where ulcerated.
3. Occupies lumen of the bowel.	Projects into the lumen of the intestine.
4. Of doughy consistence and <i>indentable</i> .	Firm and not indentable.
5. Not attached.	Attached.
6. Movable.	Non-movable or slightly so.
7. Occurs at any age.	In middle life and old age.
8. No cachexia.	Cachexia.
9. Usually odorless.	Offensive odor.
10. Comes on suddenly.	Slowly.
11. No previous history of pain or hemorrhages.	Pain always, hemorrhages frequently.
12. Not accompanied by discharge of mucus and jelly-like stools.	Free discharge of mucus and sometimes of jelly-like evacuations.
13. No loss in weight.	Rapid and marked loss in weight.

Symptoms common to both impaction and carcinoma are constipation in the beginning, diarrhea later, straining, frequent micturition, tumor, and reflected pain.

Fecal impaction is differentiated from gall-stone and enteroliths by the doughy feel and large size of the tumor. When a mass presents in the sigmoid or colon, causing dangerous symptoms of occlusion, and its nature is not apparent after getting the history and making a thorough examination by means of palpation and the colon tube, the abdomen, and if necessary the intestine are opened without delay, when an accurate diagnosis can be made.

PROGNOSIS

Where there is no organic disease comparatively few cases of uncomplicated fecal impaction terminate fatally. Located in the rectum, coprostasis may induce intense suffering until the mass is removed. Once the bowel is empty, relief is instantaneous and the patient may return to business. When the accumulation is the result of a stricture, tumor, or adhesions the prognosis is not so good because of the tendency of impaction to recur until the lesion inducing mechanical obstruction is removed. After the obstructing disease has been eradicated or colostomy performed above it and feces are given a free exit, elements of danger rapidly disappear. In cases where the fecal accumulations go unrecognized and are permitted to assume enormous proportions, death may ensue due to rupture of the intestine or perforation and peritonitis.

TREATMENT

It is very easy to quickly and easily relieve a patient suffering from slight fecal impaction low down in the rectum, but it is extremely difficult to determine the best means of bringing away single, large, putty-like masses or numerous small round, hard scybalæ that have collected at one or more points along the large bowel, and remained until they have become encysted or produced irritation and enterospasm, without causing great pain or serious injury to the bowel.

Fecal accumulations in the rectum and lower sigmoid are more easily disposed of than those situated high in the colon. Impactions in the lower bowel when of comparatively recent date are softened and brought away within a few hours by the aid of warm water, soapsuds, oil, or glycerin high and low enemata (Fig. 940) alone or in combination; but when the retention has existed for a considerable time injections are per-

sistently employed for several days before complete results are expected, because the mass is difficult to permeate and remove owing to its *mucous* covering and because it excites enteric spasm. From what has been said it may be inferred that hot injections, because of their soothing action on intestinal musculature, are more effective in relieving this condition than a similar amount of a cold solution, which excites contraction of muscular fibers. For

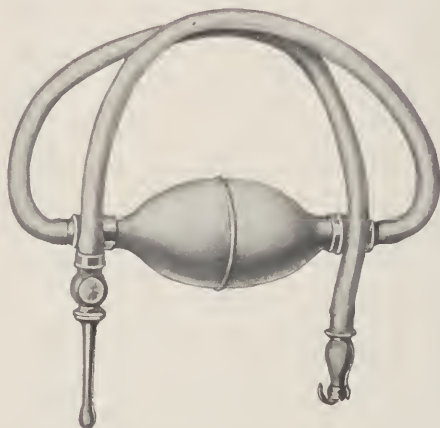


Fig. 940.—Davidson's syringe, helpful in washing out feces after the impacted mass has been broken up with the fingers, spoon handle, or gouge through a proctoscope.

many years the author has successfully employed the following combination:

Ry. Soapsuds.....	Oj	500 0;
Castor oil.....	℥j	30 0;
Glycerin.....	℥ij	60 0.

Sig.—Inject into the colon every two hours; to be retained as long as possible.

On a few occasions he has succeeded in breaking up large impacted masses by the injection of from a few ounces to $\frac{1}{2}$ pint (250.0) of hydrogen peroxid, and then washing out smaller particles with a soapsuds enema. Fecal impactions located in the sigmoid or rectum are removed with aid of a gouge, which chops the mass up so that it can be dislodged and brought away by frequent recto-colonic lavage. The gouge, finger, or handle of a spoon is satisfactorily employed in removing accumulations near the anus, but when situated in the upper rectum and sigmoid their breaking up must be accomplished through the proctoscope or sigmoidoscope with the aid of reflected light.

In chronic cases, where masses have collected in the cecum and transverse colon, the patient is given from 2 to 4 ounces of

liquid paraffin or olive oil twice daily to soften feces and lubricate the bowel and facilitate their passage through the rectum.



Fig. 941.—Hydriatic electrode.

Friction-massage is occasionally resorted to with advantage in acute impaction to break up or move masses along the colon when they are small and movable, but massage, electricity (Fig. 941), and mechanical vibration are contraindicated where impaction is chronic, extensive, hard, and there is evidence of irritability or ulceration of the bowel. In this class of cases purgatives and cathartics are contraindicated because they induce unnecessary suffering, do little good, and much harm.

Surgical Treatment.—Fecal impaction becomes a surgical disease when measures heretofore recommended fail to accomplish their purpose. In those cases where accumulations are large and distend the bowel to a dangerous degree, have become encysted, induced extensive ulceration, and the patient is threatened with perforation and rupture, it is advisable to proceed with their *removal* at the earliest opportunity by means of *enterotomy* or *colotomy*. If, however, complete obstruction has taken place and the patient is in a dangerous condition because of the accompanying distention and effects of the virulent intestinal flora and their toxins, the bowel is promptly *opened, drained*, and the mass removed at a later date, when the patient is in a condition to better withstand



Fig. 942.—Kelly's dilator, useful for divulsing the muscle, with or without local anesthesia, in cases of sphincteralgia causing impaction.

SYNOPSIS OF 45 CASES OF FECAL IMPACTION TREATED BY THE AUTHOR

No.	Name.	Age.	Sex.	Location.	Kind and shape.	Size. Weight.	Duration.	Cause.	Complications.	Treatment.	Time of treat- ment.	Result.
1	J. B.	76	M.	Sigmoid.	Hard nodular.	10 lb.	7 weeks.	Syphilitic stricture of upper rectum.	Weak heart, old age, pneumonia.	Division of stricture and removal of feces with forceps and irrigation.	10 days.	Death from exhaustion and pneumonia.
2	L. G.	40	F.	Upper rectum.	Hard oval mass, soft above.	3 lb.	4 weeks.	Syphilitic stricture.	Fecal toxemia.	Colostomy—left inguinal—and feces evacuated by irrigation.	2 weeks.	Relief from impaction; permanent artificial anus.
3	J. N.	17	F.	Rectum.	Firm oval mass size of fetal head.	1½ lb.	2 weeks.	Careless habits.	Melancholia.	Division of sphincter under local anesthesia, and mass removed with fingers and rectum irrigated.	2 days.	Recovery.
4	C. W.	30	M.	Colon, sigmoid, rectum.	Hard nodular, below soft, liquid above.	Enormous amount.	3 weeks.	Carcinoma of rectum.	Rheumatism.	Temporary colostomy; irrigation and later resection of the rectum.	3 weeks.	Relief from impaction; death from cancer in 1 year.
5	O. N.	3	M.	Lower rectum.	Firm mass.	4 oz.	1 week.	Congenital narrowing of anus.	None.	Division of stricture and removal with fingers and irrigation.	1 day.	Recovery.
6	M. Z.	1½	F.	Rectum.	Hard nodular.	6 oz.	10 days.	Stricture rectum; cause swallowing safety-pin.	None.	Sphincter divided, stricture incised, irrigation.	1 week.	Impaction relieved; stricture doing well.
7	T. D.	35	F.	Rectum.	Oval mass.	1 lb.	4 days.	Popcorn and irregular habits.	None.	Continuous irrigation with soapsuds.	2 days.	Recovery.
8	M. G.	10	M.	Sigmoid.	Irregular mass.	Not known.	5 days.	Cherry stones.	None.	High enemata, heat to abdomen, massage.	2 days.	Recovery.
9	L. D.	38	F.	Rectum.	Firm oval mass.	2 lb.	7 days.	Constipation, carelessness.	Migraine.	Division, mass broken up and removed with forceps, irrigation.	1 day.	Recovery.
10	T. B.	29	M.	Sigmoid and rectum.	Hard nodular.	Not known.	2 mos.	Hypertrophy of the levator muscle; carcinoma.	Exhaustion.	Colotomy and evacuation.	3 weeks.	Relief from impaction; death from cancer 9 months later.
11	C. G.	19	F.	Rectum.	Firm oval.	1 lb.	8 days.	Careless habits.	Insanity.	Division under local anesthesia; tumor broken up with fingers and removed by irrigation.	2 days.	Recovery.
12	W. J.	26	M.	Descending colon.	Hard nodular.	Large quantity.	2 weeks.	Adhesion from typhoid fever.	Bronchitis.	Laparotomy; adhesions broken up; mass pushed downward, broken up, and removed by irrigation.	2 weeks.	Recovery.

13	J. W.	40	M.	Rectum.	Firm oval mass.	Not known.	3 weeks.	Fibrous band in rectum.	None.	Band incised and broken up; mass divided and removed by irrigation.	6 days.	Recovery.
14	N. M.	16	F.	Rectum.	Oval mass.	Not known.	10 days.	Anal fissure.	Chlorosis.	Mass broken up with fingers; irrigation, iron for anemia.	3 days.	Recovery.
15	F. O.	37	M.	Sigmoid.	Hard nodular.	Enormous amount.	5 weeks.	Loss of tonicity.	Locomotor ataxia.	Temporary fecal fistula; irrigation, massage, electricity.	4 weeks.	Impaction removed; general condition improved.
16	H. W.	60	M.	Upper rectum.	Scybalum.	12 lb.	3 mos.	Carcinoma.	Enlarged prostate.	Inguinal colostomy; division of constriction and irrigation.	3 weeks.	Impaction relieved; death 2 years later.
17	F. C.	30	F.	Rectum.	Oval mass.	Not known.	6 days.	Retroversion of uterus, irregular habits.	Chronic constipation.	Division, removal of fecal tumor, ventral fixation of uterus.	4 weeks.	Immediate relief from impaction and constipation improved.
18	F. B.	7	M.	Sigmoid and rectum.	Irregular mass.	7 oz.	3 days.	Parched corn, irregular actions.	None.	Massage; high and copious enemata, soapsuds, oil, and glycerin.	2 days.	Recovery.
19	N. O.	56	M.	Rectum.	Hard and oval.	2½ lb.	8 days.	Lack of tonicity and glandular secretions.	Hypertrophied sphincter.	Division of splintter; breaking up of mass with fingers, irrigation and abdominal electricity and massage.	6 weeks.	Recovery.
20	E. H.	36	F.	Sigmoid.	Nodular.	Not known.	7 days.	Chronic constipation.	Pregnancy, 9th month.	Delivery of child, irrigation and massage.	3 weeks.	Recovery.
21	W. M.	70	M.	Rectum.	Oval mass.	Not known.	2 weeks.	Atony—chronic constipation.	Old age.	Broken up with rectal forceps and removed by irrigation.	3 days.	Recovery.
22	B. N.	22	F.	Rectum.	Solid mass.	Filled entire rectum.	11 days.	Sedentary occupation, irregular habits.	Retroverted uterus.	Mass broken up and removed with handle of spoon, irrigation.	1 day.	Recovery.
23	O. P.	55	F.	Rectum.	Clay-like mass.	Capacity of rectum.	2 weeks.	Lack of tonicity and exp. power.	Gall-stone colic.	Removed with handle of spoon, copious irrigation, hot fomentations.	2 days.	Recovery.
24	D. P.	38	F.	Cecum and transverse colon.	Nodular through abdomen.	Several pounds.	7 weeks.	Unknown.	Exhaustion.	Put in hospital and prepared for laparotomy.	1 day.	Death from ruptured colon before operation; abdomen filled with feces.
25	C. D.	60	M.	Rectum.	Indentable oval mass.	6 inches long by 4 broad.	1 week.	Anal fissure.	Chronic constipation, diminished secretion.	Broken up with finger and evacuated by copious enemata.	½ hour.	Tumor removed at office.

SYNOPSIS OF 45 CASES OF FECAL IMPACTION TREATED BY THE AUTHOR.—Continued.

No.	Name.	Age.	Sex.	Location.	Kind and shape.	Size. Weight.	Duration.	Cause.	Complications.	Treatment.	Time of treat- ment.	Result.
26	E. S.	30	F.	Rectum.	Hard and orange size.	15 oz.	2 days.	Hypertrophied sphincter.	Ulcerated above the anus following hemorrhage operation.	Fecal tumor macerated through the proctoscope and washed out, ulceration treated with silver nitrate applications.	7 days.	Complete relief from ulceration and impaction.
27	T. G.	50	M.	Rectum.	Clay-like oval mass.	Capacity of rectum.	3 weeks.	Lack of tonicity, irregular habits.	Hemorrhoids and proctitis.	Mass removed with finger, irrigation; hemorrhoidectomy, proctitis by fluidextract krameria injections.	4 weeks.	Complete recovery.
28	S. J.	46	F.	Sigmoid.	Irregular hard tumor.	Filled descending colon.	13 days.	Filiform band binding sigmoid down to pelvis.	Local peritonitis.	Laparotomy adhesions broken up and abdomen flushed with normal saline solution.	26 days.	Recovery.
29	W. E.	58	F.	Rectum.	Capacity of sigmoid and rectum.	Unknown.	16 days.	Hypertrophied sphincter, diminished tonicity.	Fecal vomiting, collapse; general peritonitis from perforation.	Pain eased by morphin; patient practically moribund.	1 day.	Death.
30	V. J.	40	M.	Rectum.	Hard oval tumor.	1 lb.	4 days.	Gall-stones as nucleus.	Gall-stone colic jaundice.	After division of sphincter the tumor, hard as stone, was removed intact.	1 day.	Recovery.
31	A. R.	15	M.	Rectum.	Firm round tumor.	½ lb.	2 days.	Blackberry seeds.	None.	Continuous irrigation for 15 hours.	2 days.	Recovery.
32	E. B.	20	F.	Rectum.	Hard and round.	1 lb.	1 week.	Negligence in going to stool.	Chlorosis.	Frequent enemata of oil, glycerin, and water.	1 day.	Recovery.
33	T. C.	17	M.	Upper rectum, sigmoid.	Irregular masses.	Unknown.	5 weeks.	Sarcoma.	Difficult micturition.	Colostomy and subsequent sacral resection of the rectum.	6 weeks.	Relieved of impaction and straining; died from sarcoma in 10 months.
34	J. B.	13	F.	Rectum.	Hard tumor.	Larger than an orange.	2 days.	Green corn and portion of cob.	Severe colic.	Removed with lithotomy forceps.	1 day.	Recovery.
35	J. L. D.	60	M.	Rectum.	Firm oval tumor.	¾ lb.	8 days.	Enterolith as nucleus.	Chronic dysentery.	Feces removed by irrigation and enterolith with forceps.	2 days.	Recovery.
36	H. E.	28	F.	Rectum, sigmoid.	Multiple nodular mass.	Unknown.	2 weeks.	Stricture of the rectum.	Tuberculosis.	Complete external proctotomy, irrigation, and general treatment.	.....	Local and general condition improved.

37	J. E.	45	F.	Rectum.	Firm, oval tumor.	4 lb.	3 weeks.	Paresis.	Locomotor ataxia.	Divulsion, separation of mass with fingers; general treatment.	3 days.	Impaction removed; other condition not changed.
38	O. J.	35	M.	Rectum.	Nodular.	Size of tumbler.	6 days.	Hypertrophied inflamed "rectal valve."	Strangulated hemorrhoids.	Sphincter divulsed, fecal tumor evacuated, hemorrhoids removed—"valvotomy."	8 days.	Recovery.
39	W. M.	39	F.	Transverse colon.	Multiple hard masses.	Not known.	10 days.	Carcinoma.	Indigestion.	Resection of tumor, evacuation of feces, and end-to-end anastomosis.	6 weeks.	Immediate symptoms relieved; died 8 months after from recurrence.
40	H. W.	60	M.	Rectum.	Scybala.	Rectum and sigmoid full.	18 days.	Syphilitic stricture of the rectum.	Pleurisy.	Colostomy under eucaïn infiltration; gut opened on second day, feces broken up with forceps; irrigation.	24 days.	Occlusion removed; symptoms from stricture improved.
41	E. N.	36	F.	Rectum.	Hard oval mass.	3 lb.	7 days.	Pregnancy.	Frequent micturition.	Divulsion of sphincter by inserting fingers one at a time; irrigation; removal of mass in sections.	3 days.	Recovery.
42	M. H.	40	F.	Sigmoid.	Nodular.	Unknown.	9 days.	Multiple polypi.	Polypi in nose.	Colostomy, polypi removed with author's forceps; wound closed after breaking up of feces, and irrigation.	27 days.	Recovery.
43	D. W.	57	M.	Rectum.	Oval and firm.	7 lb.	3 weeks.	Paresis.	Rheumatism.	Removed with forceps and irrigation.	1 day.	Recovery.
44	C. L.	62	M.	Rectum.	Nodular.	Unknown.	7 weeks.	Carcinoma.	Old age.	Colostomy; bowel opened on third day; irrigation until mass removed.	3 weeks.	Immediate relief; death from cancer 2 years later.
45	O. N.	23	F.	Rectum and sigmoid.	Round and hard.	5 lb.	20 days.	Inability to empty the bowel.	Retroversion of the uterus.	Tumor broken up with Gant rectal forceps; removed by irrigation.	1 day.	Recovery.

operation. In extreme cases, where coprostasis is complicated by extensive ulceration or sloughing of the gut, nothing short of *resection* or *colectomy* will relieve the patient; but when colectomy for any reason is unsuitable, the blocked segment of bowel is *excluded* from the fecal current after the manner elsewhere described or an *artificial anus* is formed.

Once the impaction has been removed, precautions are taken to prevent recurrence by curing constipation or eliminating surgical lesions interfering with propulsion of feces through the colon or rectum.

The author has successfully treated hundreds of cases of fecal impaction due to medical or surgical causes where feces accumulated in different segments of the large intestine and rectum. To give the reader an idea of the size, location, and weight of fecal masses removed, relation of sex to the condition, and varied causes of fecal accumulations he has incorporated a table of 45 cases previously published in Gant's *Diseases of the Rectum and Anus*, 1905. Many other cases of fecal impaction induced in a variety of ways have been treated by the author since publication of the table shown on pages 312-315.

Chapter XCI

Benign Growths and Cysts of the Colon and Sigmoid Flexure, Including Mesenteric Embolism and Thrombosis¹

BENIGN tumors of large intestine are comparatively rare, met with more frequently in men than women, seldom in infants and children, are encountered most often between the twentieth and thirty-fifth year, though they may occur at any age, vary from wheat grain to orange size, may be sessile or pedunculated, single or multiple, soft or firm, have a smooth or ulcerated surface, and be isolated or disseminated.

ETIOLOGY AND PATHOLOGY

Often it is impossible to determine the etiology of non-malignant growths of the colon, but in many of the author's cases they seemed to be caused by *chronic, catarrhal, tuberculous, luetic, entamebic, bacillary, balantidic*, or *gonorrheal* coloproctitis, responsible for constant smearing of the mucosa with an *acrid, irritative* discharge that excited cell proliferation. The causation of retro-peritoneal and mesenteric tumors is unknown.

Colonic and abdominal *inflammatory* neoplasms—pseudocancers—occasionally encountered may be the result of inflammatory and ulcerative intestinal disease, pericolitis, and perisigmoiditis, worms, or foreign bodies—glass, needles, pins, or fish bones—that perforate the gut, or foreign material—linen, silk sutures, and ligatures, sponges, needles, or instruments—left in the abdomen.

Inflammatory tumors have several times followed ligation of the omentum; firm inflammatory masses have also been induced by congenital anomalies, angulations, kinking and ptosis of the bowel, responsible for chronic irritation of the mucosa and pericolitis; also *actinomycosis* has induced inflammatory swelling associated with the large intestine.

Benign neoplasms have been located in all segments of the small and large intestines, but are more common in the rectum, colon, and ileum, and several varieties have been encountered, of which some are met with more often than others.

The accompanying tables compiled by King² show the relative frequency and location of various growths in different segments of the *small intestine, colon, and rectum*:

¹ See Chapter XLVII on Benign Growths of the Rectum, Anus, and Buttocks.

² Published in Surgery, Gynecology, and Obstetrics.

Fibroma.....	14
Adenoma.....	17
Myoma.....	45
Lipoma.....	29
Angioma.....	3
Teratoma.....	2
Fibromyxoma.....	3
Neurofibroma.....	3
Rhabdomyoma (malignant).....	1
Fibro-adenoma.....	2

As regards location they were distributed as follows:

Duodenum.....	5
Jejunum.....	8
Ileum.....	23
Small intestine (not designated).....	11
Ileocecal region.....	3
Appendix.....	1
Colon.....	22
Rectum.....	36
Intestine (not designated).....	10

Benign tumors of the colon and sigmoid flexure may be *rare*, as *angioma*, *teratoma*, *myxoma*, *actinomycotic*, *gummata*, *tubercular*, *neoplastic*, *lymphadenoma*, and *parasitic*; or *common*, as *adenoma*, *myoma*, *lipoma*, *fibroma*, and *inflammatory* tumors.

Neoplastic tubercular tumors and *gummata*, having received due consideration in separate chapters, their further discussion has been omitted here.

Since the symptoms, diagnosis, and treatment of *unusual* are practically the same as for more *common* types of benign growths of the colon, detailed discussion of the former has been considered unnecessary.

Nearly all benign neoplasms of the colon, sigmoid flexure, and rectum become *pedunculated* owing to being dragged downward by feces, and when they do, are designated as *polyps* irrespective of histologic structure.

King, quoting Heurtaux, states that "benign tumors may arise from (a) the mucosa—*adenoma*; (b) the submucosa—*fibroma*; (c) the muscularis—*myoma*; (d) the fat cells of the external coat—*lipoma*; (e) the fibrous tissue of the subserosa—*fibroma*; (f) epiploic appendages—*lipoma*; (g) the vessels of the intestinal wall—*angioma*; (h) possibly from muscularis mucosa—*myoma*. He thinks this last source of origin is doubtful due to the poor development of the layer, and further states that, theoretically, tumors may spring from other tissues of the intestinal wall, but that such tumors have not as yet been reported."

Adenoma.—Colonic adenomas (Fig. 943) are usually secondary to or accompanied by one or the other types of chronic ulcerative

colitis complicated by a copious irritating discharge, and in such cases tumors are numerous, soft or fragile, variable in size—pea to walnut—have a short or long pedicle, and may be scattered from the ileocecal valve to the anus, being more numerous and larger in the rectum and sigmoid than upper colonic segments (Fig. 944).

These neoplasms originate as roundish, elevated, red or purplish papilloma-like masses, and usually become paler in color, firmer, and develop a short or long, round, or flat pedicle as they enlarge; their surface may remain smooth, be nodulated, or become irregular and denuded when growths degenerate.



Fig. 943.—Large polyp—adenoma—that induced obstruction by blocking the ileocecal valve (Army Med. Museum).

Large single polyps, rare in the colon and common in the rectum, usually occur in persons unafflicted with colitis, and are composed of glandular and connective tissue.

Adenomas may contain considerable fibrous, muscular, or lymphoid tissue, when they are designated *adenofibroma*, *adenomyoma*, and *adenolymphoma*. In these growths glandular tubes are usually numerous, closely packed, encompassed by connective tissue, and have an epithelial covering consisting of cuboid and cylindric cells. Sometimes glands atrophy or degenerate, leaving closed outlets or diminutive caverns in tumors. Partial or extensive desquamation of epithelium may be observed in neoplasms,

their stalks, or both, and the blood-tinted viscid secretion from such areas also contains serum, leukocytes, and eosinophils.

Adenomas may persist for years without undergoing malignancy, but the majority degenerate into cancer (Fig. 946) in from one to seven years, depending on the patient's vitality, degree of irritation, and character of the tumors, for *soft* polyps more often undergo malignant change than *dense* or fibro-adenomas.

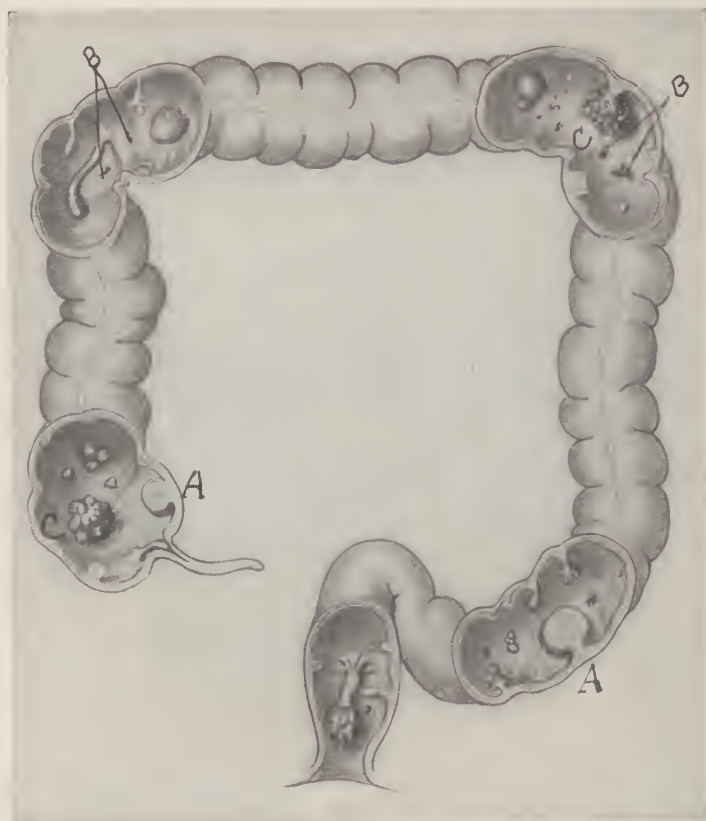


Fig. 944.—Polyposis complicating ulcerative colitis. Note diminutive round papillomata, numerous polyps, variable size, shape and length, having narrow and broad pedicles, some of which (A) are sectioned; B, ulcers; C, adenomata undergoing cancerous changes.

Multiple Adenoma—Adenomatosis—polyposis (Figs. 944, 945)—often diagnosed as papillomas, originate in *deep* glandular structures; while *true papillomas*, which are smaller, develop *superficially* from columnar epithelium and seldom become pedunculated.

Multiple adenomas encountered in individuals having a lowered resistance, are numerous, scattered through the bowel, and secrete

a thick, offensive, glairy or blood-tinted mucoid discharge responsible for tenesmus and frequent evacuations.



Fig. 945.—Bowel excised for colonic polyposis with malignant degeneration of two tumors. Gut split open showing numerous papillomata together with large and small polyps—adenomatosis. Colectomy by the author. The father and sister of this patient suffered from multiple adenomata.

The author has treated 68 cases of rectocolonic *polyposis*—adenomas; in a few instances there were no antedating gastric



Fig. 946.—Bowel, same as preceding illustration, arrow points to adenoma at the splenic flexure, that had undergone carcinomatous degeneration. Colectomy by the author.

or colonic inflammatory lesions, growths being discovered through the sigmoidoscope while examining for other affections.

These neoplasms are designated *villous adenomas* when villi upon their surface hypertrophy and form soft, teat, or raspberry-like enlargements smeared with glairy, tenacious, blood-tinted mucus.

The author has several times observed the transitional stages of rectal and sigmoidal adenomas, seeing them gradually change from benign into malignant tumors—adenocarcinomas—through the sigmoidoscope, and the specimen shown in Fig. 945 contained numerous innocent growths, variable in size, having pedicles of different length, and one hard infiltrating adenocarcinomatous tumor (Fig. 946).

This case, a woman twenty-three years of age, was interesting as her father died of polyposis, and her sister—twenty years old—now under treatment is suffering from multiple adenomata; all were previously affected with ulcerative colitis.

Adenomas may remain benign for years, but in most instances become malignant within one to seven years depending on softness of the growth, vitality of the patient, and degree of irritation.

Myoma.—Adeno- and fibromyomas are encountered more often than true myomas, which are usually flat or egg-shaped and rarely pedunculated. These growths, more common in females and young adults, are rarely diagnosed except by exploratory laparotomy or at autopsy, since they are seldom accompanied by bleeding or discharge and symptoms are vague.

Lipoma.—Adipose tumors may be intramural, or located in or outside the colon, but usually originate in subperitoneal fat, and after penetrating the musculature displace the mucosa, forming lobulated or pedunculated soft smooth tumors variable in size.

Fibroma.—True fibrous neoplasms of the colon and sigmoid flexure are rare, but fibro-adenomas and fibromyomas are more common. These growths, which occur with equal frequency in the small and large intestine, may be pedunculated, large or small, and smooth or nodulated.

Fibromas may or may not be encountered in patients afflicted with colitis and, as a rule, are not suspected until they cause obstructive manifestations.

The author recently treated a woman forty years of age, whose body was studded with *neurofibromas*—Recklinghausen's disease—in whom the mucosa of the rectum and sigmoid flexure as high as visible through the sigmoidoscope was covered with round, firm, whitish, sensitive nodular tumors, having characteristics of the neoplasms in the integument.

Inflammatory Tumor.—Neoplasms located in the colon, ad-

jacent to it, or elsewhere in the abdomen, designated inflammatory for want of a better name, are fairly common.

Inflammatory tumors which are characterized by hyperplasia of connective tissue resulting from irritation incident to foreign bodies or bacterial activity, are frequently associated with ulcerative colitis or inflammatory lesions in adjacent organs, and have also apparently been caused by ligation of the omentum and encysted foreign bodies. These growths, sometimes called *pseudocancers*, may be absorbed, undergo necrosis or become infected, terminating in abscess, and in any case cause obstructive manifestations.

SYMPTOMS

The manifestations of *benign* are about the same as for *malignant* growths given elsewhere (Chapter XCII), except



Fig. 947.—Invagination of the ileum into the cecum induced by large polyp having a long pedicle that was removed by ileotomy.

cachexia is not so marked, there is less loss of weight, glandular enlargement is absent or rare, other organs are not involved, there are no metastases, symptoms develop more slowly, and obstruction (Fig. 947) is usually not so serious owing to smaller size and slower growth of the neoplasms.

In the beginning patients notice an indescribable sensation in the abdomen, followed by constipation, diarrhea, costiveness

alternating with loose movements, glairy mucus in the stools, localized tenderness, fecal and gas accumulations, abdominal

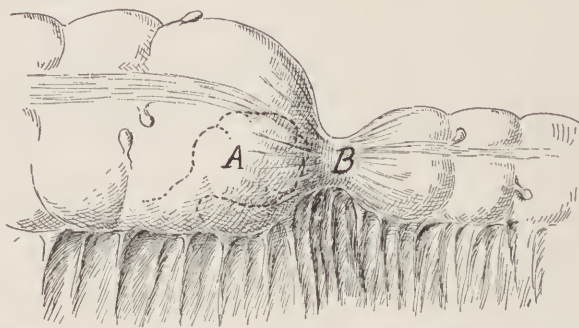


Fig. 948.—Large polyp (A) causing (B) enterospasm of the colon.

distention, meteorism, often palpable tumor, enterospasm, and muscular rigidity.

When tumors are numerous and variable in size, as in polyposis—multiple adenomas—usually secondary to catarrhal or specific



Fig. 949.—Sigmoidoscopic view of polyps—adenomata—complicating aggravated chronic mixed infection amebic colitis.

ulcerative colitis, digestive disturbances are marked, diarrhea is persistent, the patient exhibits a septic appearance, frequently suffers from cramps, enterospasm (Fig. 948), anorexia, loss of sleep,

frequent desire to stool, and an offensive discharge composed of mucus, pus, and clotted or bright red blood.

DIAGNOSIS

Single growths are frequently not suspected until they cause obstruction, but multiple polyps scattered through the bowel should be diagnosed by the symptoms mentioned, finding of tissue in evacuations, or locating growths in the rectum with the finger, or inspecting them through the sigmoidoscope (Fig. 949); visible peristalsis is a reliable sign when tumors causing obstruction are not palpable.

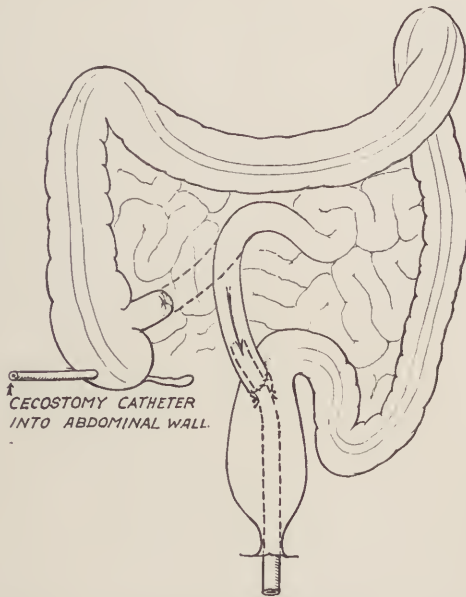


Fig. 950.—Ileorectostomy reinforced by cecostomy performed for chronic ulcerative colitis complicated by polyposis.

Occasionally colonic neoplasms are isolated by inflation, which lifts the growth upward or enables one to define it by palpation and percussion, or they may be detected with the aid of fluoroscopy or radiographs.

TREATMENT

Excepting multiple adenomas, the treatment of benign neoplasms of the colon and sigmoid flexure does not differ much from that recommended in Chapter XCII for cancer, except that the lymph-nodes can be ignored.

Resection is the ideal procedure, but when growths are inoper-

able, the patient cannot withstand a long operation, or declines extirpation, drainage is provided and obstruction relieved by establishing a controllable *artificial anus* (see Chapter XCIV and Figs. 1031, 1035) proximal to the block, or the involved segment of gut may be excluded by *entero-anastomosis*, *unilateral* or *bilateral exclusion* after one of the plans illustrated and described in Chapter XCV and Figs. 1060, 1064, 1067.

When function of the colon is permanently impaired by multiple adenomas—polyposis or other neoplasms—*colectomy* (see Chapter XCII and Figs. 967, 971) is indicated, because in most instances *conservative treatment* fails, and some of the growths may undergo malignant changes.

Polyps restricted to the rectum and lower sigmoid are easily destroyed by *fulguration* (Fig. 555) applied three times weekly with aid of sigmoidoscope, leaving large fibrous polyps to be removed by attaching *Gant valve clamps* (Fig. 552) or applying *pressure forceps* having detachable handles to their pedicles (Fig. 550), or by *ligation* (Fig. 546), clamp and cautery operation (Fig. 556), or *excision* (Fig. 546).

In 3 instances the author has cured rectocolonic multiple papillomas and adenomas by performing *appendicostomy* (see Chapter XCIII and Figs. 1001, 1019) or *cecostomy* (see Chapter XCIII and Figs. 999, 1000), and thoroughly irrigating the large intestine and rectum twice daily with ichthyol 2 per cent., and destroying

growths in the lower bowel by *fulguration*, following which the appendical and cecal openings were closed by cautery or fulguration spark.

Occasionally polyps and other non-malignant colonic tumors are removed—excised—by *colotomy* (Fig. 951).

Cysts.—Retroperitoneal and mesenteric cysts, which are more common than suspected, may be congenital or acquired, unilocular

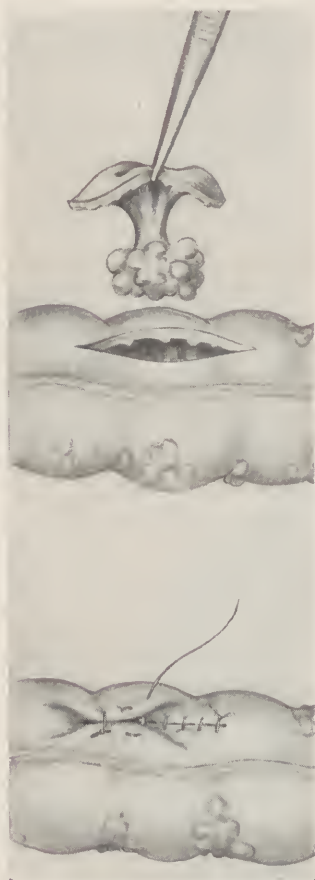


Fig. 951.—Polyp removed by colotomy. Wound closed by through-and-through reinforced by infolding sutures.

or multilocular, and vary in size and shape. As retroperitoneal cysts enlarge they interfere with gut nutrition through pressure, and may also cause symptoms of obstruction by narrowing the bowel lumen. These growths may be absorbed, but gradually become distended with colorless lymphatic or chyle-like fluid.

The **symptoms** from mesenteric cysts, except for a greater tendency toward hemorrhage and irregular temperature, are the same as other tumors obstructing the bowel.



Fig. 952.—Gas cysts of the small intestine (Turnure).

The **treatment** of retroperitoneal and mesenteric cysts varies: (a) they are *incised* and *drained* if irremovable, (b) *enucleated* when possible, and *resected* with the intestine when they block the bowel or impair its circulation.

Gas Cysts (Intestinal Emphysema, Intestinal Pneumatoses).—Cysts containing colorless, odorless, non-combustible gas, common in pigs and rare in human beings, are usually associated with gastro-intestinal inflammatory lesions (Figs. 952, 953) or diseases augmenting intra-abdominal pressure.

Gas cysts or air-filled vesicles may be single, but are usually

multiple, involving a lengthy bowel segment, vary from wheat grain to olive size (Fig. 953), and may be encountered in the submucosa or subserosa, entering these spaces through dilated lymph- or blood-vessels, ulcers, or puncture from foreign bodies.

Retained or escaping gas incites inflammatory reaction, resulting in distention of the abdomen with a clear serous fluid or gas. Air cysts are mostly lined with endothelium and seldom contain bacteria.

The **symptomatology** is uncertain and the **diagnosis** seldom made except by exploratory laparotomy.



Fig. 953.—Intestinal gas cysts. Sectional ileum shows numerous cysts resembling soap-bubbles (Sloan).

The **treatment** in cases not making a spontaneous recovery consists in performing *laparotomy* as for tubercular peritonitis, *evacuating cysts by puncture*, removing them with *scissors*, suturing rents in peritoneum, destroying endothelium with pure *carbolic*, and in deplorable cases *excluding* or *resecting* the involved bowel, or in urgent cases forming an *artificial anus*.

Omental Cysts.—Cysts of the omentum, which are more common in children than adults, may be congenital or acquired,

single or multiple, large or small, and isolated or widely scattered, show a tendency to refill, and remain benign or undergo malignant degeneration. Omental cysts that attain enormous size usually contain leukocytes, blood-cells, mucus, albumin, and usually a clear chocolate or amber-colored fluid, though the contents vary; they have thin connective-tissue walls, lined with epithelium, characterized by dilated blood-vessels. *Hydatid* and *dermoid* cysts have occasionally been encountered in the colon and sigmoid flexure.

The **symptoms** are the same as for other large abdominal cysts and tumors, but they are rarely **diagnosed** before celiotomy.

The most satisfactory **treatment** consists in *dissecting them free, ligating the pedicle, and excising them*. Some surgeons favor *tapping*, which is dangerous and must be repeated.

Mesenteric Embolism and Thrombosis.—*Infarcts*—*acute* or *chronic*—of the mesentery, most common in middle-aged men and rare in children, usually occur in individuals suffering from endocarditis, valvular disease, hepatic cirrhosis, and atheromatous degeneration of vessels, and obstruction is encountered more often in the superior than in the inferior mesenteric vessels.

Collateral circulation may be re-established if the infarct be slight, but when extensive a corresponding length of gut becomes edematous and later gangrenous if unrelieved.

Thrombosis usually complicates catarrhal or specific ulcerative colitis owing to microbes entering the lymphatics and capillaries.

The chief **symptoms** of mesenteric vascular obstruction are constipation or diarrhea, hemorrhage, obstructive manifestations, distended rigid abdomen, peritonitis, excruciating pain, abdominal rigidity, paralytic ileus, nausea, vomiting, and abdominal pain and tenderness.

The **diagnosis**, which is seldom made before operation, is based on the above enumerated symptoms, patients having a disease favorable to thrombosis and embolism, profuse hemorrhage, palpable tumor, discolored gut—chromatosis—and bloody fluid in the abdominal cavity.

The **prognosis** is favorable when *small* vessels are blocked and ulcers form, and serious when *large* arteries and veins are occluded and collateral circulation is cut off, because in such instances death from intestinal *gangrene* or *obstruction* rapidly ensues unless quickly relieved by operation.

Conservative **treatment** is seldom effective in this class of cases, and one must rely on *resection* or establishment of a temporary or permanent *artificial anus*. The mortality is high and fecal fistula is a frequent sequela unless all the gangrenous bowel is excised.

Chapter XCII

Malignant Growths of the Small Intestine, Colon, and Sigmoid Flexure (Carcinoma, Sarcoma)¹

THIS chapter is devoted to malignant disease of the colon and sigmoid flexure, since *benign* and *transitional* neoplasms have already been fully considered (Chapter XCI), and cancers of the *anus*, *rectum*, and *rectosigmoidal* juncture have been fully discussed elsewhere.

MALIGNANT GROWTHS OF THE SMALL INTESTINE

The disease occurs more often in men than women, and is encountered less frequently here than in the colon and rectum.

In Nothnagel's 343 collected postmortem intestinal cancer cases neoplasms were located as follows: duodenum, 7; ileum, 10; colon, 164, and rectum, 162.

The order of frequency in which malignant growths occur in different segments of the gastro-intestinal tract are: stomach, rectum, sigmoid, cecum, ascending, transverse, descending colon, appendix, duodenum, ileum, and jejunum.

In Sutton's collection of 100 cases 75 were in the rectum, 23 in the colon, and 2 in the small intestine.

Of malignant neoplasms affecting the small and large intestines in the author's cases, **80 per cent.** were located in the *rectum*. Leichtenstein's statistics indicate that of bowel cancers only 4.3 per cent. are encountered in the small intestine. Of 449 cases collected by the author, the ileum was involved in 11 and the jejunum in 2 instances.

Malignancy of the small gut has been encountered in childhood, middle life, and old age, the average being about forty-five years. Malignant disease in the small intestine causes less loss of weight than when the growth affects the large bowel, and is not so often accompanied by metastases, which if present or slight, show a predilection for lymph-glands, liver, kidneys, and ovaries, the prognosis of the disease here being less favorable than when situated in the colon and rectum.

Most cancers in this region are cylindric-celled *carcinomas*—*medullary*, *scirrhous*, or *colloid*—though *sarcomas*—different type—are proportionately more frequent here than in lower segments of

¹ See Chapter XLVII devoted to Benign Growths and Cysts of the Rectum, Anus, and Perianal Region.

the bowel, and the *prognosis* of small intestinal is less favorable than colonic or rectal cancer.

The chief **symptoms** of cancer in the upper intestine are diarrhea, occult blood in the stool early, and proximal visible peristaltic waves incited by tapping abdomen with fingers, but manifestations in the incipient stage are rare.

The **diagnosis** is made before operation or autopsy in about 50 per cent. of cases, and based on the above symptoms, partial or complete obstruction, fluoroscopic examination, and radiographs, cancers in the small bowel are palpable preceding occlusion.

Since **palliative** and **radical treatment** of small intestinal is practically the same as for colonic cancer hereafter discussed their further consideration is deemed unnecessary.

MALIGNANT GROWTHS OF THE COLON AND SIGMOID FLEXURE

General Remarks.—As in other segments of the gut, colonic cancer is met with more often in men than women, being in the author's recent series 18 males and 14 females.

Carcinomatous and sarcomatous disease have been encountered in the colon and sigmoid from infancy to old age, but the author has not observed a case under fifteen years, and the age of occurrence in his series is given in the accompanying table:

STATISTICS OF THE AUTHOR'S CASES OF COLONIC CANCER

Number.	Age, years.	Location.	Number of cases.
2	10 to 20	Cecum	3
4	20 to 30	Ascending colon	1
7	30 to 40	Hepatic flexure	4
8	40 to 50	Transverse colon	2
6	50 to 60	Splenic flexure	3
5	60 to 80	Descending colon	1
		Sigmoid flexure	18
32	Males, 18 Carcinoma, 31	Females, 14 Sarcoma, 1	32

Colonic cancer is in the majority of instances located in the *sigmoid flexure* in approximately 50 per cent. of cases, and next in order of frequency are the cecum, hepatic flexure, splenic flexure, transverse colon, descending colon, and ascending colon. Of intestinal cancers 80 per cent. are *anorectal*.

Malignant disease of the large intestine is being encountered more often in persons between twenty and thirty years of age than

formerly, due to increased frequency of catarrhal and specific colonic infections accompanied by the formation of multiple polyps, particularly adenomata, many of which when neglected early degenerate into malignancy.

Etiopathology.—The *causation* of *colonic* is the same as for *anorectal* malignancy given elsewhere, of which *trauma* and *irritation* incident to congenital deformities, ulcers, inflammatory lesions, cicatrices, constipation, and fecal impaction are the principal predisposing factors.

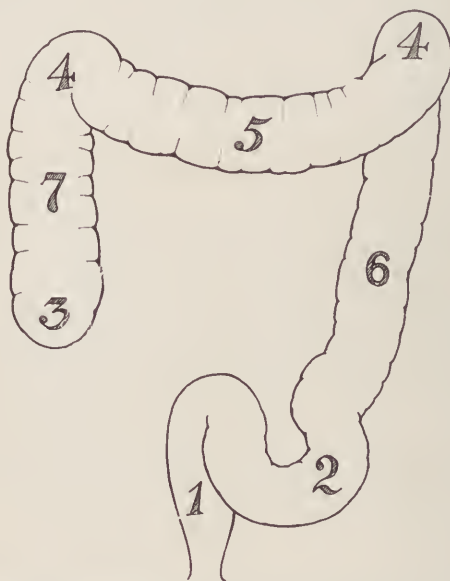


Fig. 954.—Schematic drawing of colon, sigmoid flexure, and rectum showing most frequent locations of cancer in the large intestine, sigmoid flexure, and rectum named in order of their frequency: 1, Rectum; 2, sigmoid; 3, cecum; 4, hepatic and splenic flexures; 5, transverse; 6, descending, and 7, ascending colons.

Malignant disease of the large intestine frequently occurs in patients suffering from *chronic diarrhea* and *polyposis* (Fig. 955), and in constipated individuals suffering from colonic angulation, flexures, adhesions, twists, or ptosis, segments of bowel constantly irritated by passage of feces.

The author within a year treated 3 patients afflicted with multiple adenomas in whom one or more growths underwent *transitional* changes, being converted from pendulous polyps into typical infiltrated nodular adenocarcinomas, in one of whom the progress of degeneration was observed from time to time through the sigmoidoscope. The history of another of these cases is par-

ticularly interesting, as her father previously died of cancer secondary to polyposis; her sister, aged twenty, now has numerous polyps in the rectum, sigmoid, and colon, and is cachectic, as was her sister prior to colectomy, which was indicated, since the excised gut contained numerous papillomata and adenomata varying in size, and an indurated infiltrating mass (Fig. 946) located in the transverse colon having the microscopic and other characteristics was diagnosed as adenocarcinoma by the Frederic E. Sondern laboratories.

The author knows of no other specimen showing a malignant growth and benign neoplasms of the colon; this is of value since it *provides* direct proof that simple adenomata may undergo can-



Fig. 955.—Colonic polyposis—adenomatosis—with malignant degeneration. Arrow points to polypus occluding appendiceal opening. Colectomy by the author.

cerous degeneration, as occurred in this patient, who was but twenty-two years of age.

Types of Colonic and Sigmoidal Cancer.—Malignant disease in the large bowel may be *carcinomatous* or *sarcomatous*, and in the author's series of colonic cancer cases (Fig. 954) there were 31 carcinomas and 1 sarcoma.

Carcinoma.—This type of malignancy (Fig. 956) is more common than believed, for it is usually mistaken and treated for other affections until obstruction is obvious or the patient dies.

These cancers are of the cylindric—*columnar*—celled variety, of slow growth, and recur less often than malignancy in the small intestine.

Adenocarcinomas of the large intestine are clinically classed as *medullary*—soft, encephaloid; *scirrhous*—hard (Fig. 956); *colloid*, and *melanotic*—black cancer—depending on the degree of degeneration and predominance of *cells*, *stroma* or *pigment* all possessing *glandular* elements.

In the colon and sigmoid flexure *scirrhous* or *hard* is encountered more frequently than medullary or *soft* cancer, while the reverse is true in the rectum, hence hard *annular*—ring-like—neoplasms are *common* and large *nodular masses* or *cauliflower growths* (Fig. 957) are *rare* in colonic segments.

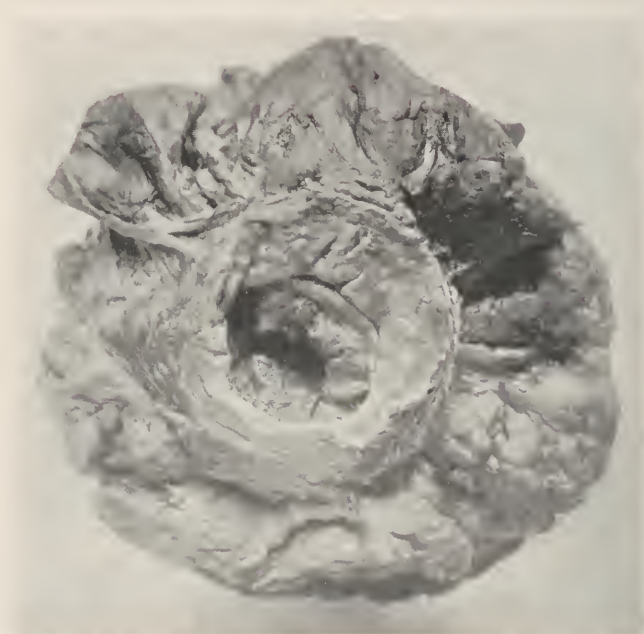


Fig. 956.—Annular scirrhous carcinoma of the colon causing almost complete obstruction, resected by the author. Patient living ten years after operation.

Malignant neoplasms here are usually *primary* and *single*, though *secondary* and *multiple* growths have been encountered; neoplasms in this vicinity seldom attain large size, extensively involve lymph-glands or other organs, and are not prone to recur following *early excision*.

Malignant disease develops more rapidly in young than older subjects, and medullary attain dangerous proportions more quickly than scirrhous or hard cancer; the greater the proportion of connective tissue, the slower the growth and the lower the malignancy.

Melanotic cancers are extremely rare in the colon, and the author has never observed a case, but has encountered degenerating colloid—gelatinous—carcinomas in 2 instances.

Sarcoma.—These neoplasms, which are rare and more common in the ileum than colon or rectum, may be large or small, single



Fig. 957.—Carcinoma, cauliflower type, involving the rectum and sigmoid. In this case the lower sigmoid and the entire rectum were excised by the author, and the patient was alive and well three years after operation.

or multiple, nodulated or diffuse, primary or secondary, and occur at any age, but are met with more frequently in children and young adults than carcinoma.

The author has operated for colonic sarcoma in 2 instances, one in a boy fifteen years old, in which the growth almost completely obstructed the bowel.

The author has observed sarcoma of the large intestine and rectum 14 times, viz.:

Colon.....	1
Sigmoid flexure.....	1
Rectum.....	4
Perianal region.....	8
	<hr/>
	14

The physical characteristics and early manifestations of large intestinal sarcomas simulate those of *neoplastic tuberculosis*, and usually attack the cecum, sigmoid flexure, or rectum.

Sarcomas of the large intestine may be soft or firm and be of the *small, large, round, or spindle-celled* type, and dominated by *fibrous, muscular, or lymphoid* elements; the small-celled variety is soft, of a rapid growth, and extremely malignant; the neoplasms are usually *white*, but in rare instances are *pigmented* melanotic—black.

For a more complete discussion relative to the histopathology, symptoms, and diagnosis of carcinoma and sarcoma, the reader is referred to other chapters, where they have been fully considered in connection with *anorectal* cancer.

The *routes* by which *extension* takes place in malignancy of the colon and sigmoid flexure must be understood to enable the surgeon to perform radical operations with the minimum chance of recurrence, though cancer here is usually localized, exhibiting but a slight tendency to glandular involvement except in later stages of the disease. These neoplasms extend along the bowel and to *contact lymphatics*, rarely involving retroperitoneal and distant lymph-nodes in the mesocolon, though these glands are frequently inflamed and swollen; metastasis in other organs is rather rare.

Symptoms.—Manifestations of *intestinal* cancer vary, depending on duration of disease, degree of obstruction, and segment of gut involved.

When the growth affects the *duodenum* symptoms are mainly gastric: anorexia, impaired digestion, nausea, vomiting, gas distention, epigastric pain and soreness, and irregular soft evacuations; when the *jejunum* and *ileum* are involved gastric disturbances are not less in evidence, and the patient complains of colic, active intestinal spasms, constipation followed by diarrheal attacks, impaired digestion, frequent desire to evacuate gas, abdominal soreness and tenderness on pressure, moderate loss in weight, manifestations of stasis, occult blood and mucus in the stools, and later explosive diarrheal attacks, localized abdominal dis-

tention, coffee-ground evacuations, and finally marked obstruction or peritonitis following perforation.

Malignancy of the *ileocecal angle* and *ascending colon* is accompanied by the usual manifestations of *chronic appendicitis*, mild digestive disturbances, moderate constipation or diarrhea, or one alternating with the other, elevated irregular temperature, flatulence, fulness and soreness in the right hypochondriac region, and rigidity of the recti during periods of exacerbation.

Manifestations of lower *colonic* and *sigmoidal* cancer are more regular and less distressing than those induced by similar neoplasms located in the small intestine or right colon. Malignant disease in the colon and sigmoid flexure is seldom recognized early owing to *vagueness* of symptoms, indescribable sensation of something wrong, mild irritability of the gastro-intestinal tract, slightly impaired digestion, abdominal discomfort, and unsatisfactory evacuations. As the growth enlarges or ulceration supervenes, symptoms become more *definite* and the patient complains of constipation, diarrhea, or costiveness alternating with loose movements, pain, tenderness, and gas distention over the colon or vicinity of the growth, visible peristalsis, mucus at first and later mucopurulent blood-tinted discharge, tarry stools, abnormally formed feces, which may be evacuated soft like sheep dung, or in long, round, or tape-like stools if the intestinal caliber is diminished; when stenosis is high stools may be *normal* if liquid content passes the block and feces solidify before evacuation. Coffee-ground stools are the rule, but clear blood may be discharged when the growth is in the lower sigmoid or rectum.

The amount of mucus, pus, and offensiveness of discharge is proportionate to the degree of degeneration in the tumor mass.

Tenderness over the affected segment or entire colon is often continuous, but usually colic is not troublesome until obstruction is marked. Tympanites is present and gas is freely evacuated in early, and with difficulty in late stages of the disease. Constant desire to stool is annoying when the growth is in the lower sigmoid or rectum, but is seldom a complication of high colonic cancer.

Frequent fluid evacuations are extremely troublesome when the bowel is nearly occluded and feces collect in large masses, or hardened scybalæ collect above the obstruction which are not frequently mistaken for the growth.

In neglected cases of fully developed colonic cancer the patient is cachectic, markedly under weight, and rapidly becomes depleted the result of indigestion, absorption, diarrhea, insomnia, and worry over his condition.

Dilatation above the neoplasm incident to gas and fecal distention is common, and perforation leading to peritonitis may result from such accumulations or from cancerous or stercoral ulceration.

Frequent visible general or localized peristalsis accompanied or followed by colonic gurgling is an almost constant manifestation when the bowel lumen is diminished.

A common but rarely recognized indication of malignant disease in the colon, sigmoid, or rectum is the sudden appearance of numerous round, *blood-red*, slightly elevated spots, and flat pigmented—reddish—warts widely scattered over the thoracic and abdominal integument.



Fig. 958.—Secondary carcinomatous involvement of mesenteric lymph-nodes (metastases).
Photograph by the author from specimen in Carnegie Laboratory.

Metastases in the mesentery (Fig. 958) and elsewhere are an occasional complication of colonic cancer.

Reflected pains in the sacrococcygeal, vesical, or prostatic region and down the leg are distressing complications of large cancers in the lower sigmoid and rectum.

Diagnosis.—Malignant disease in the *small intestine* is usually difficult and sometimes impossible to diagnose, and 50 per cent. of cases go unrecognized until the patient is in a serious condition or dies from obstruction or perforation and peritonitis.

Exploratory laparotomy is justifiable in patients who at short or long intervals suffer from profound digestive disturbances,

diarrhea alternating with constipation, flatulence, constant desire to evacuate gas, abdominal uneasiness, occasional colic, occult blood, and glairy mucus in the stools and visible peristalsis even when a tumor cannot be detected by palpation or defined by *fluoroscopy* or *radiography* following a barium meal (Fig. 959).

There is no longer excuse for failing to diagnose cancer in the *rectum* or *lower sigmoid* because they can be felt with finger or inspected through a pneumatic sigmoidoscope; but when neoplasms are located in the *upper sigmoid flexure* and *colon* they are

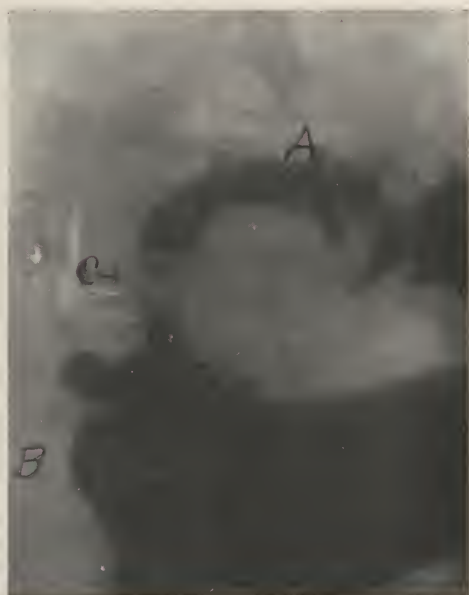


Fig. 959.—Radiograph of annular carcinoma of the sigmoid resected by the author. The cecum was removed at the same operation for neoplastic tuberculosis. The patient, with exception of temporary fecal fistula, made an uneventful recovery and remained well a year following operation. *A*, Partially filled descending colon; *B*, rectum and lower sigmoid distended with barium mixture; *C* indicates location and extent of the growth.

occasionally difficult to recognize in their incipient stage, since they are not palpable, and early manifestations simulate those of malignant disease situated in the small intestine or ileocolic angle.

Fully developed cancer wherever located in the large bowel produces *typical symptoms*—alternating constipation and diarrhea, colonic distention, soreness and tenderness, localized abdominal pain, an offensive discharge containing mucus, pus, blood, and tissue *débris*, digestive disturbances, anorexia, loss of weight, cachexia, inability to sleep, frequent or constant desire to evacuate feces or gas, *pencil-* or *tape-like* stools when the obstruction is low,

feeling as if feces and gas were arrested at a definite point, fecal impaction and unrelieved sensation of abdominal fullness, visible peristalsis and gurgling sounds in vicinity of the growth.

Meyer emphasized the diagnostic significance of the early and rather sudden appearance of diminutive blood-red *capillary angiomata*—numerous pigmented spots or flat warts in the abdominal skin, *malignant stigmata* frequently observed by the writer in colonic cancer cases.

Obstruction is ever a manifestation of colonic malignancy, and may develop slowly or suddenly, and be due solely to clogging by the tumor or blocking of the stenotic opening by a fecolith or foreign body; in such cases leukocyte count is high, frequently



Fig. 960.—Arrows point to carcinoma of transverse colon near the splenic flexure.

ranging from 20,000 to 25,000, white polymorphonuclear may remain from 65 to 70 per cent.

The author has found the carcinoma skin reaction used by Elsberg and Abderhalden's test of little diagnostic value, and so-called "intestinal stiffening" has seldom been observed.

Greater reliance is placed on inspection of the abdomen, deep palpation, colonic percussion, studying peristaltic waves, analyzing the stools and discharge, observing intestinal movements with the fluoroscope, inspecting the bowel through the sigmoidoscope, studying radiographs made following barium meals (Fig. 960), and enemata, and examining pelvic contents with one hand on the abdomen and finger of the other in the rectum or vagina.

Case summarizes the *x-ray* findings in carcinoma of the large bowel as follows:

1. Exaggeration of the normal antiperistalsis giving the appearance of "peristaltic unrest" to the barium content above the site of the obstruction.

2. Arrest or hindrance in the onward progress of the barium meal.

3. Arrest or noticeable hindrance in the ascent of the barium stream when such an enema is given.

4. Coincidence of a palpable tumor with the point of hindrance in the progress of the opaque meal or enema.

5. A filling defect in the shadow of the barium-filled colon. Frequently the filling defect is digitated, indicating a cauliflower growth; at times it may be annular, so that an annular carcinoma may be diagnosed.

6. The amount of barium enema which may be injected is frequently indicative of the site of the lesion.

7. The colon is often markedly distended by gas, and gas collections are seen surging backward and forward due to the alternations of peristalsis and antiperistalsis.

8. Marked ileal stasis when the neoplasm involves the cecum, ileocecal valve, or the first part of the ascending colon.

Colonic growths are palpable in 40 per cent. of cases; when located in the transverse colon they are movable, and the aortic pulsation is often transmitted through them, and more than 60 per cent. of this class of sufferers exhibit preoperative obstructive manifestations; the neoplasms are soft or nodular in the right, and hard or ring-like in the left colon.

The *differential diagnosis* is usually not difficult, though cancer of the colon and sigmoid has been confused with *non-malignant growths*, *neoplastic tuberculosis*, *diverticula*, *gumma*, *actinomycosis*, *chronic appendicitis*, *gall-bladder*, *liver* and *kidney neoplasms*, and *fecal impaction* diseases, discussed elsewhere.

Prognosis.—Life may be prolonged and patients kept fairly comfortable by conservative measures and enterostomy or colostomy, but intestinal cancer is hopeless in inoperable cases.

Prognosis is fairly good, particularly in cancers of the colon and sigmoid, if excised early, there being comparatively few recurrences.

Treatment.—Time is not wasted with conservative measures, and the growth, if operable, whether in the small intestine, colon, or sigmoid flexure, is extirpated immediately, otherwise the patient will in time succumb, since *x-rays* and radium, which sometimes

cure anal epithelioma, fail to permanently relieve patients afflicted with glandular, colonic, sigmoidal, or rectal cancer.

Palliative Treatment.—Palliative or surgical palliative measures are indicated in the treatment of patients who are inoperable, decline radical surgical intervention, and those who are exhausted or suffer from complicating disease that precludes prolonged operation.

Conservative measures *useful* in this class of cases are encouragement, mild outdoor exercise, and tonics that improve the patient's general health; regulating the diet and prescribing nourishing food, leaving a small residue of softened feces that easily pass the obstruction, laxatives and high enemata that liquefy or soften evacuations, paraffin oil to lubricate the bowel, remedies that procure free comfortable stools; opiates, hypnotics, and hot fomentations that relieve pain and procure sleep; belladonna when enterospasm is troublesome, and hot oil enemata, which dislodge clogging feces.

Surgical Palliative Treatment.—When the above therapeutic measures fail to relieve suffering, prevent obstruction, and keep the bowel free of irritating ingesta, toxins, and acrid discharges, palliative operations discussed below are performed immediately to relieve obstruction, put the bowel at rest, permit thorough irrigation of the involved gut, measures employed in conjunction with *irradiation*, or *x-rays* which frequently cause partial shrinkage of the growth, alleviate pain, minimize discharge, lessen toxemia, improve the general health, and lead to prolongation of life.

The following are the operations most frequently employed in the *surgical palliative* treatment of malignant disease located in the small intestine, colon, and sigmoid flexure:

1. Appendicostomy.
2. Cecostomy.
3. Ileocecostomy—Gant's.
4. Enterostomy.
5. Colostomy.
6. Intestinal exclusion {

{	(a) Entero-anastomosis.
{	(b) Unilateral exclusion.
{	(c) Bilateral exclusion.

Appendicostomy.—Three times the author has performed stab-wound appendicostomy after the plan described and illustrated elsewhere (Chapter XCIII) to relieve patients suffering from cancerous ulceration or partial obstruction complicated by polyposis, intestinal toxemia, anemia, or ulcerative colitis.

Following appendicostomy and through-and-through daily co-

lonic warm irrigations, using a 2 per cent. ichthyol or 4 per cent. boric acid solution, the patient is greatly relieved and his condition markedly improved, because heat is comforting and minimizes muscular irritability and enterospasm, liquefies or softens feces, diminishes toxemia and danger of sepsis by washing out bacteria, toxins, acrid discharge, and malignant tissue *débris*, heals inflammatory and ulcerative areas, and encourages the patient, who feels something definite is being done to mitigate suffering.

An appendical vent renders additional service by permitting the introduction of oil and emulsions containing bismuth and intestinal antiseptics which lubricate the bowel, protect ulcers and inflamed areas, diminish bacterial activity, and soften feces, enabling them to more easily pass the obstruction.

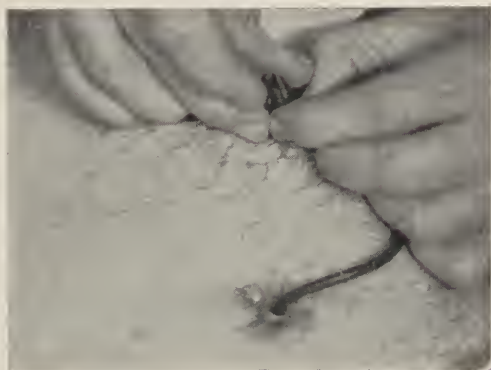


Fig. 961.—Appendicostomy: Catheter introduced and being closed by a cravat clamp following colonic through-and-through colonic irrigation.

The author has several times resorted to appendicostomy or cecostomy in conjunction with *short-circuiting* and *unilateral* or *bilateral exclusion* to drain and permit the *excluded* segment of gut to be irrigated, thereby eliminating auto-intoxication and distention from accumulating secretions and feces.

Cecostomy and Ileocecostomy.—When under the above conditions appendicostomy is not feasible because the appendix is absent, strictured, very short, small, or firmly bound down by mesentery, cecostomy (Fig. 999), or Gant's ileocecostomy is substituted, using the technic described in Chapter XCIII. These procedures are preferable to appendicostomy when a large opening for more copious irrigation is required, but the author's *enterocecostomy* is indicated when there are inflammatory lesions involving both ileum and colon (Fig. 993).

Enterostomy.—Preliminary, temporary, or permanent enter-

ostomy, preferably *ileostomy*, is occasionally necessary in the treatment of malignant disease located in the small intestine, ileocecal valve, iliocecal angle, or ascending colon (Fig. 1022).

The opening is made in the lowest feasible point in the small gut so as not to interfere with the digestive process and to avoid irritation of the wound by the fluid feces that occur when the outlet is made higher up.

At first the patient has no control over movements, which are frequent and fluid, but in a few weeks, when the artificial anus has been established after the manner advocated in Chapter XCIV, the ileum gradually assumes colonic functions, and feces are usually retained until firm and evacuated once or twice daily.



Fig. 962.—Author's stab wound cecostomy: Method of retaining catheter in cecum with star-shaped piece of adhesive and preventing leakage with cravat clamp.

Colostomy.—Approximately 25 per cent. of malignant growths in the colon and sigmoid flexure are inoperable when first seen, and *permanent* colostomy (Fig. 1045) is imperative in most cases, since dangerous obstructive and other manifestations cannot be prevented or relieved by other means.

Colostomy is not curative, but diminishes suffering, forestalls obstruction, enables one to treat the involved gut above and below by medicated applications and irrigations, prevents feces reaching the growth, and enables the attendant to keep the diseased area free of discharge, factors favoring shrinkage of the neoplasm and the inflammatory exudates, and betterment of the patient's condition; occasionally it makes possible a later excision operation.

An artificial anus also facilitates treatment—*radium* and *x-ray*

—of the cancer when inoperable, and before and following operation when the growth is excised.

Colostomy for rectocolonic cancer unquestionably prolongs life, but in the majority of instances the sufferer succumbs in from four to nine months, though several patients lived from fifteen to forty-eight months (see Chapter XCIV). The average duration of life in colonic malignancy subsequent to operation is approximately six months, which is longer than following rectal cancer.

Colostomy *preliminary* to resection, by days or weeks, is occasionally resorted to for obstruction to permit the patient to recuperate, insure a clean operative field, and as a preliminary step when

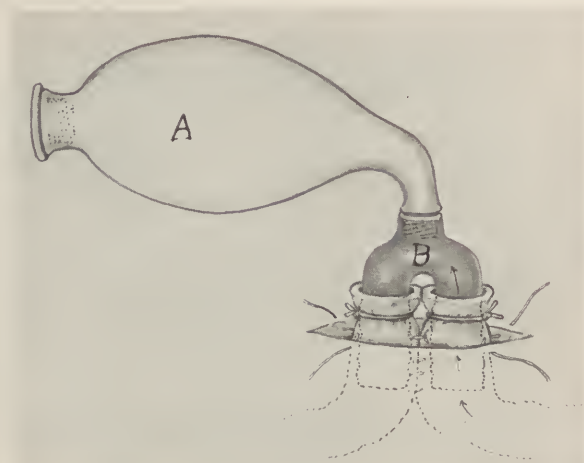


Fig. 963.—Author's colostomy as performed for colonic cancer with acute obstruction when resection is impracticable: *A*, Author's fecal reservoir which is screwed on to *B*, his two-way hard-rubber drainage-tube about which proximal and distal ends of the bowel are ligated preceding closure of the wound.

the growth is to be extirpated and a permanent artificial anus is to be established.

Temporary colostomy (see Chapter XCIV) is performed in cases of attempted resection where completion of the operation is abandoned owing to extensive involvement or alarming condition of the patient. Under such conditions after being sutured to the skin the bowel is divided and the ends ligated about large rubber tubes left projecting through the dressings, to be amputated several days later, or it is punctured and ligated about a large tube to provide drainage while waiting for the formation of surrounding adhesions.

In 2 of the author's cases growths were removed, one during operation and the other subsequent to suturing the bowel to the

skin. In the *first* instance continuity was re-established by dividing the spur with a Gant clamp and subsequently freshening edges and closing the opening over the bowel with interrupted linen sutures (Fig. 1079), and in the *second* by detaching and anastomosing the bowel end to end, using through-and-through reinforced by peritoneal stitches (Fig. 1080).

On another occasion anastomosis was impossible owing to extent of the neoplasm removed, and the proximal end was sutured in the inguinal region and the distal inverted closed and returned to the pelvis.

The operation has also been varied by establishing an opening between arms of the loop with Murphy button or McGraw's rubber

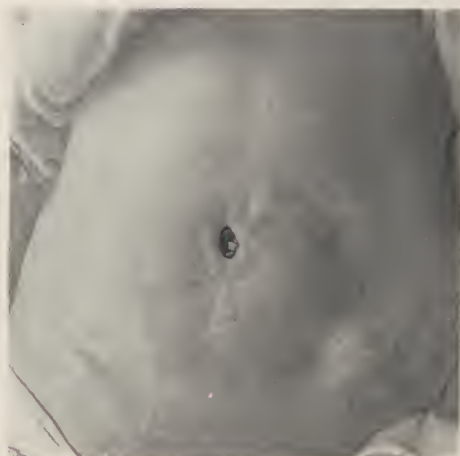


Fig. 964.—Moderate ventral hernia and numerous large scars—partial stricture—about colostomy opening resulting from extensive infection of the abdominal wound.

ligature previous to anchoring the involved intestine outside, which was followed by excision of the cancer and later freeing and suturing bowel ends and closing the abdomen.

When there is acute obstruction the mortality from *preliminary* is under 5, but is 10 per cent. or more in *forced* colostomy performed in connection with or as an emergency when resection is begun and abandoned.

Patients strenuously object to an artificial anus in the abdomen, and as a substitute in elderly women the author has sometimes attached the sigmoid or colon to the split posterior vaginal wall, denuded and sutured the labial margins, leaving a small opening below the urethra, thereby making an artificial rectum out of the vagina (Figs. 1054, 1056), a less objectionable procedure.

The reader is referred to Chapter XCVI for the technic of establishing and closing artificial ani.

Intestinal Exclusion.—Patients understanding conditions, given the choice, usually prefer *exclusion* (Fig. 1067) to *colostomy*, since they are not annoyed by the *former*, and are constantly distressed by the *latter*, owing to position of the anus, involuntary evacuations, odor and noise of escaping gas, difficulty attending defecation, and frequent soiling of clothing by mucus and feces.

The principal objections to *exclusion* are: the proximal often cannot be joined to the distal bowel below when the growth is low down owing to lack of room, danger of malignant involvement later, and frequency with which stricture forms at the point of



Fig. 965.—Ventral hernia and procidentia of the descending colon, a sequel to colostomy where the opening was made too large.

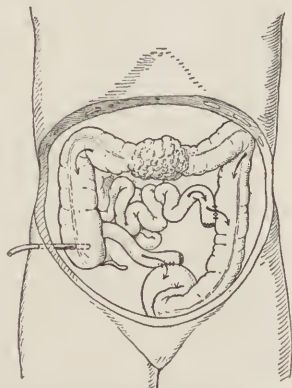


Fig. 966.—Colonic exclusion for carcinoma of transverse colon. In this case ileocolostomy, ileorectostomy, and cecostomy were performed to relieve obstruction and drain all segments of the lower bowel and permit colonic irrigation.

anastomosis. Colostomy has the advantage of being a permanent opening suitable in size formed in the gut proximal to the cancer.

There are several ways of excluding the malignant obstructed segment of intestine: (a) by *entero-anastomosis* below the growth (Fig. 1063); (b) *unilateral exclusion*—dividing and closing the colon proximal or distal to the tumor and anastomosing the ileum or colonic segment from above with healthy gut below (Fig. 1059); and (c) *bilateral exclusion*—where the bowel is doubly clamped, divided on either side of the neoplasm, and the proximal anastomosed with the distal segment of intestine, following which extremities of the excluded cancerous colon or sigmoid are inverted and closed or sutured in the wound providing for drainage (Fig. 1064).

Subsequent to ileosigmoidostomy the author angulates the ileum near the excluded colon (Fig. 1065) to prevent regurgitation,

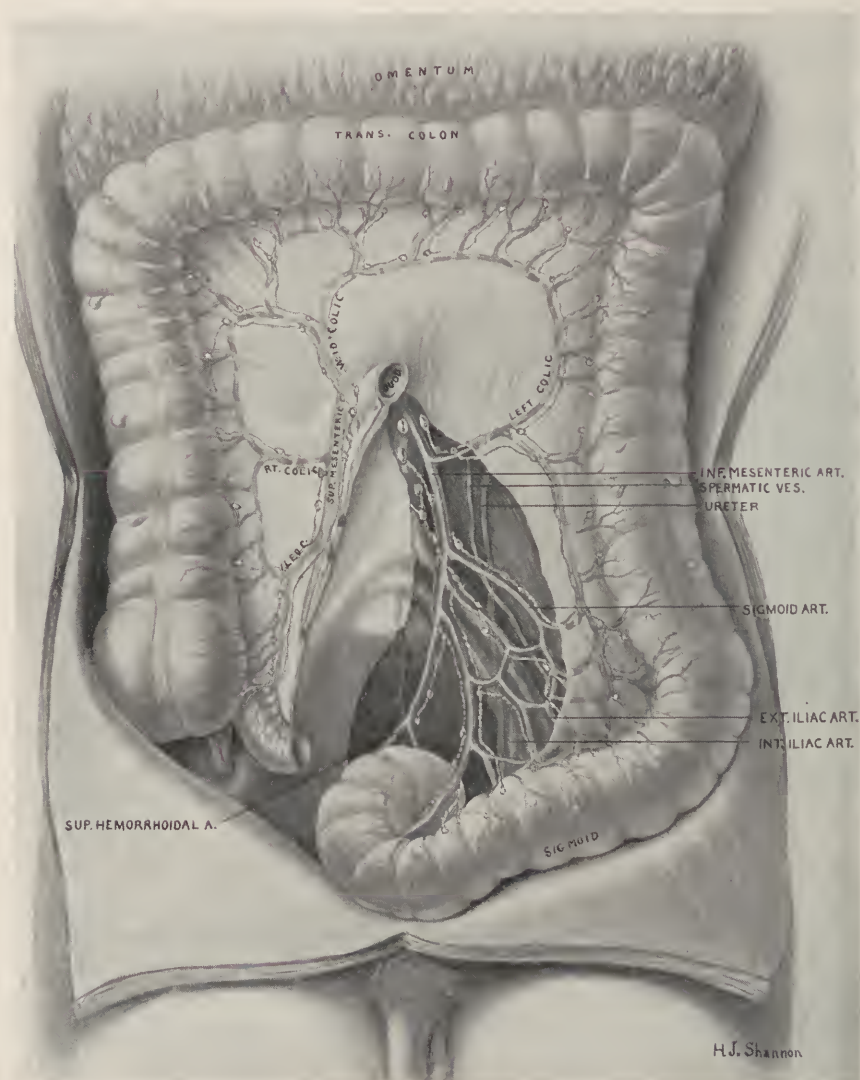


Fig. 967.—Showing distribution of the arteries, veins, lymph-vessels, and nodes concerned in ileocolic resection, colectomy, sigmoidectomy, and the combined operation for proctectomy.

and establishes drainage by appendicostomy or cecostomy (Figs. 1067, 1071) to permit secretions accumulating in the short circuited

intestine to be irrigated, thereby saving the patient much discomfort and lessening auto-intoxication.

The indications for technic of and results to be expected from intestinal exclusion are fully discussed in Chapter XCV.

Radical Treatment—Extirpation.—Since *simple palliative* and *surgical palliative* only mitigate suffering or prolong life, and *x-ray*

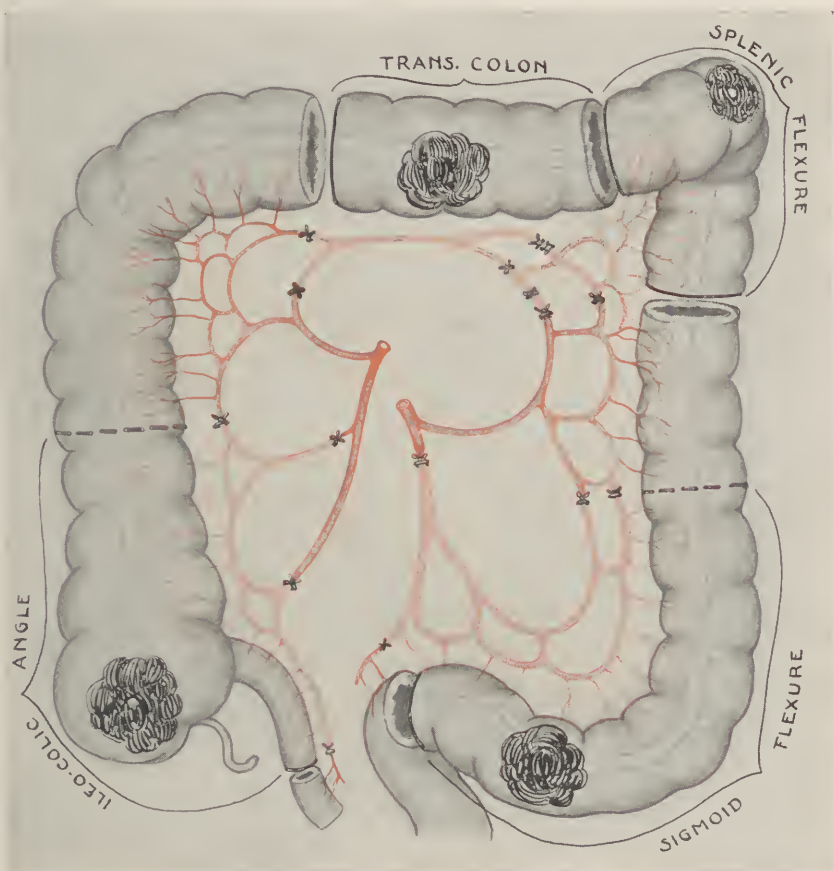


Fig. 968.—Colectomy: Schematic drawing showing manner of ligating vessels when different segments of colon are resected for cancer—colectomy. Pale indicate ligated, and bright red vessels those which have not been tied off.

and *radium applications* never cure cancer involving the colon or sigmoid flexure, valuable time is not wasted with them, otherwise the patient loses his only chance for a cure.

All growths in the colon and sigmoid flexure are *extirpated* as soon as their malignant or suspected cancerous nature has been

determined and patient's consent to operation has been obtained, unless serious contraindications—nephritis, diabetes, arteriosclerosis, serious heart lesions, marked anemia from loss of blood, or exhaustion—are present that preclude colectomy, sigmoidectomy, or prolonged operation of whatever kind.

Colectomy—Resection.—When feasible, *resection* is the only treatment for cancer, and the operation is designated *colectomy*, *cecectomy*, or *sigmoidectomy*, depending on the segment of bowel removed (Fig. 971). Successful removal of the growth brings immediate relief and affords the patient a good opportunity for a permanent cure, since malignant glands in close contact with the bowel are removed and metastases in other organs are rare.

The mortality is not very high owing to mobility of the colon and nearness of lymphatics affected by the growths.

The author's mortality is 20 per cent. for sigmoidal and 15 per cent. for colonic cancer, the greater danger of sigmoidectomy being accounted for by the fixed position of gut in the pelvis and close relation to vital organs.

The Mayos—1898-1915—did 419 resections of the colon, with a mortality of 14.5 per cent. The accompanying table of McGannon gives ultimate results according to location of the tumor:

Location of tumor.	Obstructive group.			Non-obstructive group.		
	Cured.	Inoperable, living.	Dead.	Cured.	Inoperable, living.	Dead.
Cecum.....	5	2	10	5	2	8
Appendix.....	..	..	..	1	1	
Ascending and hepatic.....	1	1	7	0	0	8
Transverse.....	2	0	2	0	0	1
Splenic and descending.....	1	1	6	0	1	3
Sigmoid.....	4	3	15	0	2	3
Unknown.....	..	..	1	..	1	
Multiple.....	..	..	..	..	..	1
Totals.....	13	7	41	6	7	24

Mortality from *right-* is less than from *left-*sided resections because liquid feces are less septic and anastomosis not so difficult and dangerous (Mayos).

The *operability* varies, being proportionately greater in women and elderly patients than in men and younger persons.

Operability percentages vary from 10 to 70 per cent., but some operators perform colectomy on patients upon whom others would

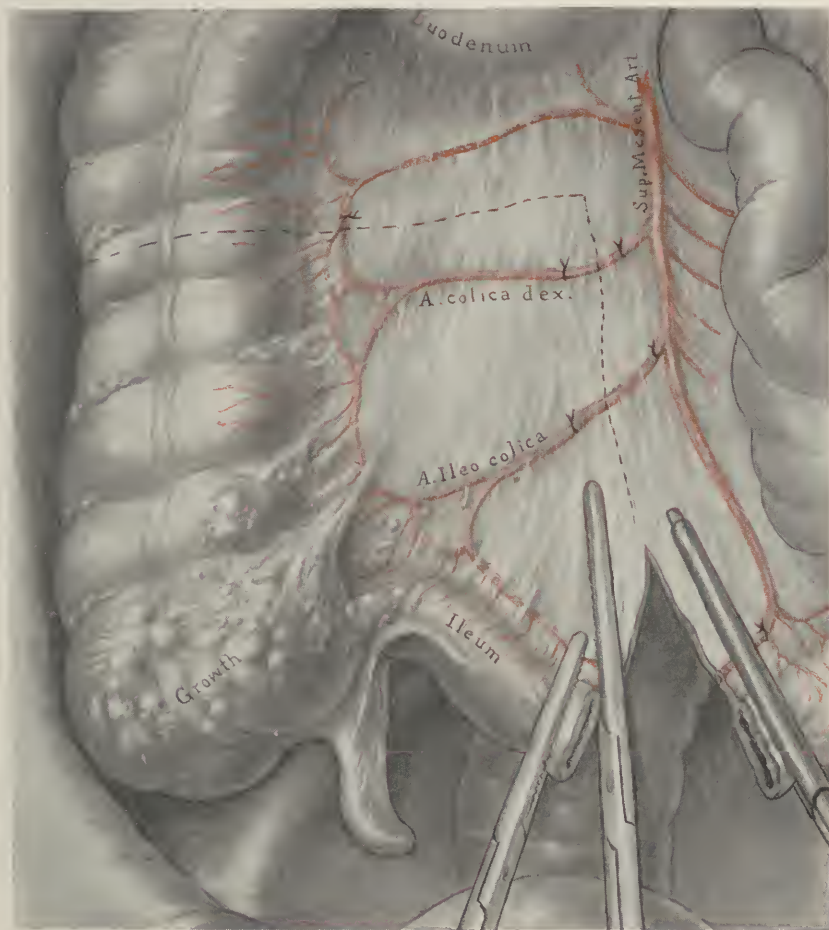


Fig. 969.—Ileocecal angle resection—*cecectomy*: Preliminary steps in resection for cecal cancer. Dotted lines indicate the *block* method of colonic or sigmoid excision, necessary vessels tied, ileum divided, and mesentery doubly clamped and partially incised.

refuse to operate. Mortality is low when the growth is restricted to a mobile colon, and rises as the more fixed and difficult cases are attacked.

Recurrences are few with *low* and numerous with a *high* operability percentage. Of the author's cases the operability was 40 per cent. and recurrences 1 in 3 within five years.

Mortality is considerably less when colectomy is preceded by the formation of an artificial anus.

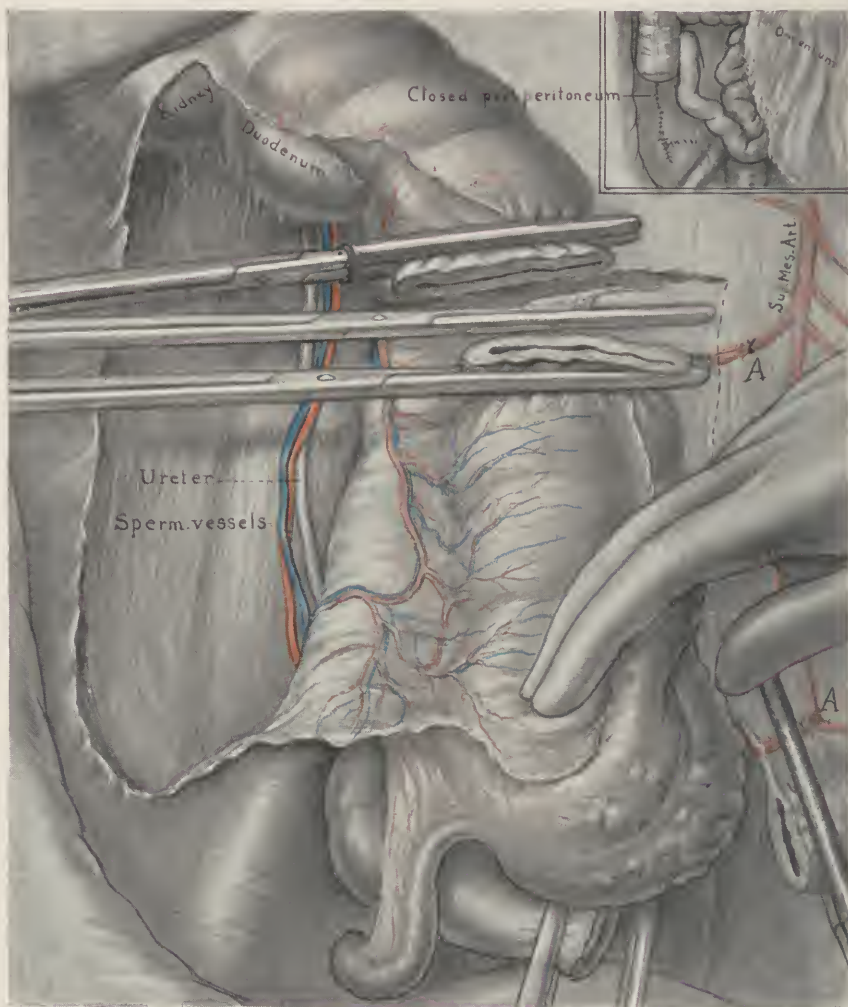


Fig. 970.—Ileocecal angle resection—*cecectomy*: Final steps in cecal resection. The ileocecal angle has been almost isolated by splitting peritoneum, cutting mesentery on the outer side, rolling the bowel inward, severing the ileum, dividing the ascending colon between clamps with cautery, incising the mesentery transversely to the dotted line, and tying (A) branches of the superior mesenteric artery. Insert shows proximal ends of ileum and ascending colon closed and anastomosed—ileocolostomy—peritoneal wound sutured, and omentum replaced.

Technic.—The steps in colectomy and *resection* of different colonic segments and the sigmoid flexure are practically the same except that different arteries are ligated—for extirpation of the

ileocecal angle and *cecectomy* (Figs. 969, 970), the *ileocolic*; *ascending colon*, right colic; *hepatic flexure*, middle colic; *transverse colon*, middle and left colic; *splenic flexure*, left colic; *descending colon*, left colic; *middle sigmoid*, sigmoid arteries; *sigmoid* and *upper rectum*, inferior mesenteric, superior hemorrhoidal, and lowermost sigmoid arteries (Fig. 986).

Resection of the cecum is seldom performed, for it is easier and less dangerous when operating for growths here to excise the ileocecal angle (Figs. 969, 970).

In cases of malignancy complicated by obstruction and toxemia colectomy is inadvisable until the bowel has first been drained and the patient's condition improved by preliminary colostomy; where the growth has been extirpated immediate and permanent results are better when an artificial anus has been established, which shortens the operation and minimizes shock, leaving bowel ends to be united later if desirable—*two-stage operation* (Figs. 628, 1052). A still safer method is the *three-stage procedure*, which consists, *first*, in bringing out the cancerous bowel and suturing it to the skin; *second*, amputating gut and growth, and *third*, freeing ends and re-establishing continuity. A *fourth stage* is required when the colostomy spur is divided with the author's valve clamp or forceps (Fig. 1078), edges of the artificial anus are freshened, and the wound is closed extraperitoneally (Fig. 1079).

Colectomy at one operation (Fig. 971) is *ideal*, but is employed in incipient cases where the growth is not extensive and the bowel movable.

Steps in the operation are varied according to the segment of bowel diseased (Fig. 968), extent of growth, involvement of neighboring structures, lymph-vessels and nodes, and condition of the patient.

Preparation for colectomy is the same as given elsewhere for proctectomy and combined excision of the rectum.

Colostomy (see Chapter XCIV) precedes removal of the colon when there is acute obstruction, fecal impaction, or the patient is exhausted. Some surgeons perform *preliminary colostomy* to make colectomy safer, but in favorable cases the author prefers straight colectomy, which avoids prolonged convalescence, annoyance of an artificial anus, and necessity for a second or third operation.

When mobilizing the bowel and dividing arteries extreme care is taken to avoid injuring the *duodenum*, *ureters* (Fig. 970), *vas deferens*, and *iliac vessels*, according to the part of colon involved.

Occasionally an opening is accidentally made in the bladder, stomach, or loop of small intestine when the neoplasm is large or

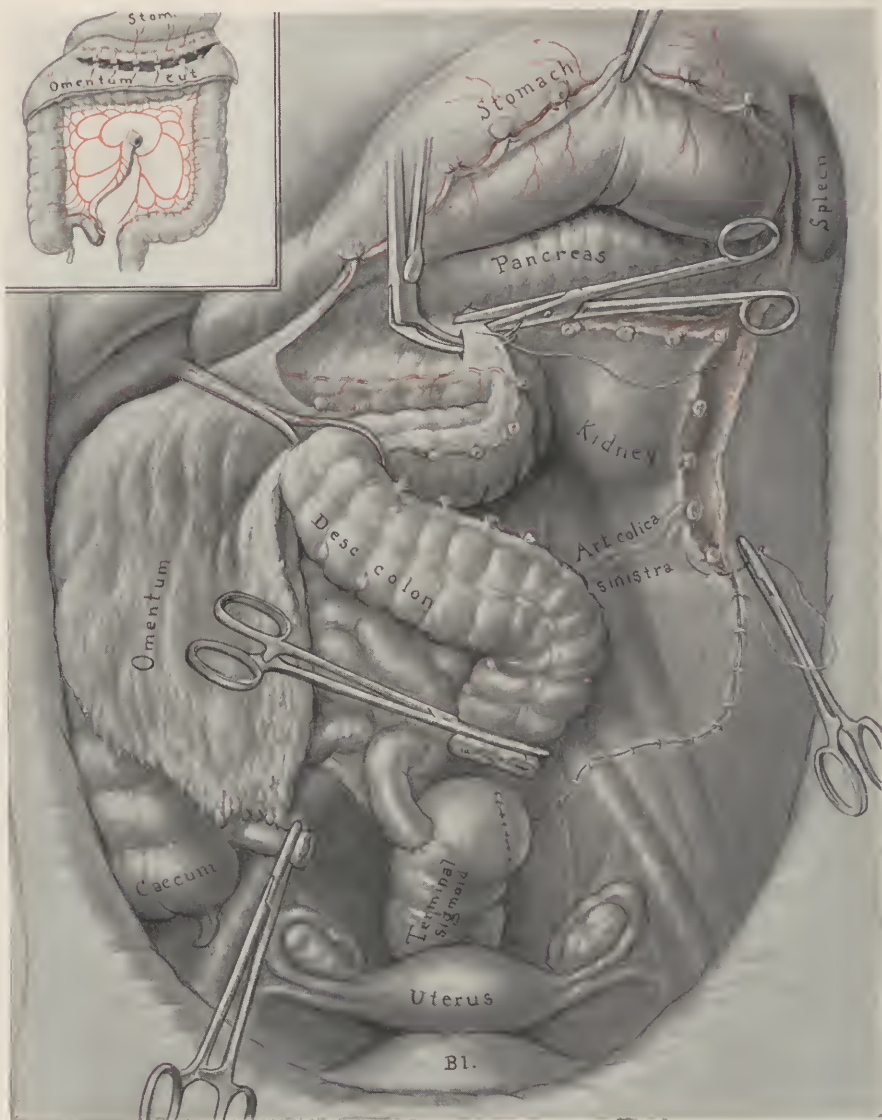


Fig. 971.—Colectomy: Showing important steps in author's colectomy—mobilization and retraction of colon inward following severing of ligated vessels (Fig. 968), tying off and dividing mesentery in segments with aid of ligature carrying forceps; tying and incising omentum connecting stomach and large intestine, clamping and dividing ileum and colon with cauter following crushing of the gut, implanting proximal end of ileum into the closed terminal sigmoid flexure (left), and manner in which ligated mesenteric stumps are buried by suturing the peritoneum over them (right). Insert shows method of ligating and dividing the omentum in freeing colon from the stomach, and arrangement of vessels requiring ligation and division in colectomy.

has formed extensive adhesions, and in the *first*, damage is repaired by sutures, and in the *last* with suture or resection and re-establishing continuity of the small gut.

Horsely, Gibson, and Soresi have demonstrated that the colon may be *spliced* by a section of small intestine if surrounded with omentum. *Small* are more easily approximated than *large* gut

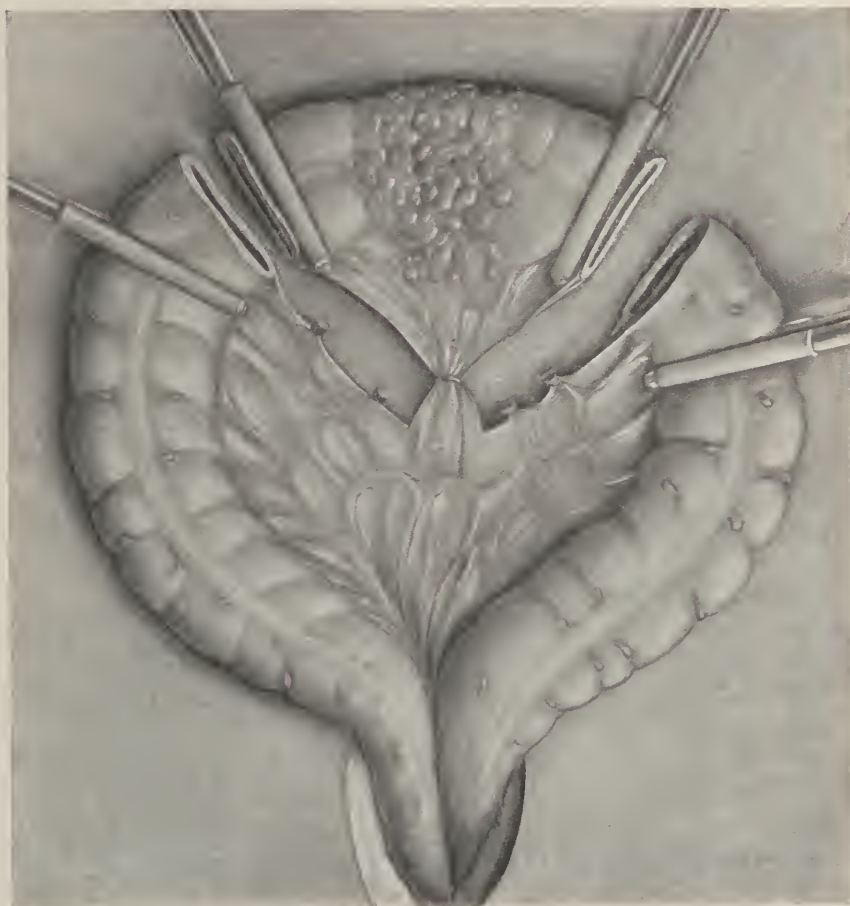


Fig. 972.—Method of doubly clamping bowel on either side of growth and ligating and dividing the mesentery.

ends, and it is advisable to safeguard the suture line with an omental or peritoneal graft. A reasonable amount of healthy gut is removed on either side of the cancer to insure against recurrence, for several feet of the small intestine and a large segment of the colon may be excised without greatly increasing mortality or impairing the bowel function.

Jameson and Dobson, Hartmann, Archibald, the Mayos, and Moynihan have contributed to our knowledge concerning colonic *lymphatics* and methods of dealing with them in colectomy (Fig. 967).

Colonic extirpation, to be effective, includes the *neoplasm* and *mesentery* with adjacent and distant *lymph-vessels* and *nodes*



Fig. 973.—Method of introducing Maunsell's mesenteric through-and-through stitch in circular enterorrhaphy.

receiving *direct* or *indirect*—drainage through arcades—from the cancer, together with connecting blood-vessels, which according to the segment of bowel involved embraces removal of the *ileocolic chain*—cecum—*right colic*—ascending colon; *right* and *middle colic*—hepatic flexure; *middle* and *left colic*—transverse colon—*left colic*—

splenic flexure; *left colic*—descending colon—and *inferior mesenteric chain*—*sigmoid arteries*—chains of glands—when the sigmoid flexure is diseased (Fig. 967).

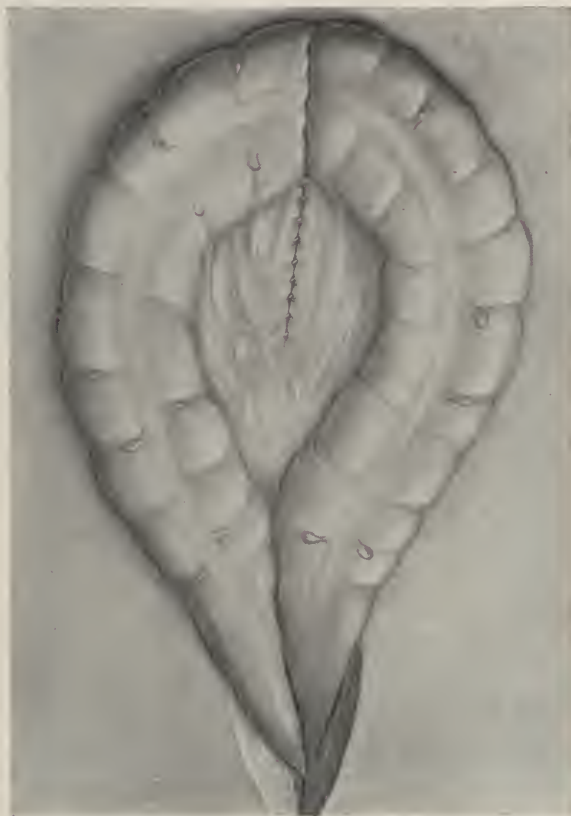


Fig. 974.—Seromuscular coats and mesentery accurately approximated.

Lymph-nodes, which may be single or in groups and of variable size, are designated *epicolic* and unimportant when attached to appendices epiploicæ (Fig. 967); *paracolic* (Fig. 967) when on the vascular arches or their branches; *intermediary* (Fig. 967) if midway between vascular arcades and larger arteries; and *main group glands* (Fig. 967) when situated at or near principal vessels; all of these are directly or indirectly connected with the neoplasm, making their removal necessary. *Complete* is seldom justifiable, since practically all cancers can be extirpated by *partial colectomy* (Fig. 968).

The incision for *colectomy* varies with the segment to be extirpated, being made through the *right* (Fig. 969) for excision of the cecum, ileocolic angle, ascending colon, or hepatic flexure; through

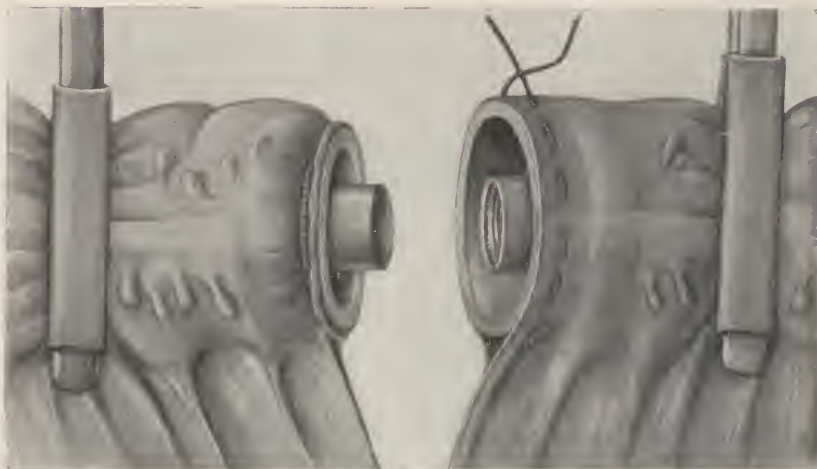


Fig. 975.—End-to-end anastomosis with Murphy's button.

the *left rectus* (Fig. 986) when the sigmoid flexure, descending colon, or hepatic flexure is removed; in the *median line* when the trans-

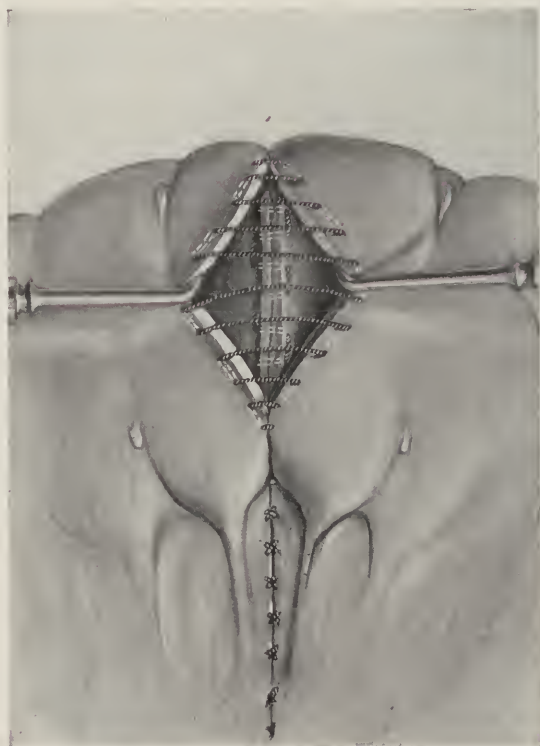


Fig. 976.—Connell's continuous suture.

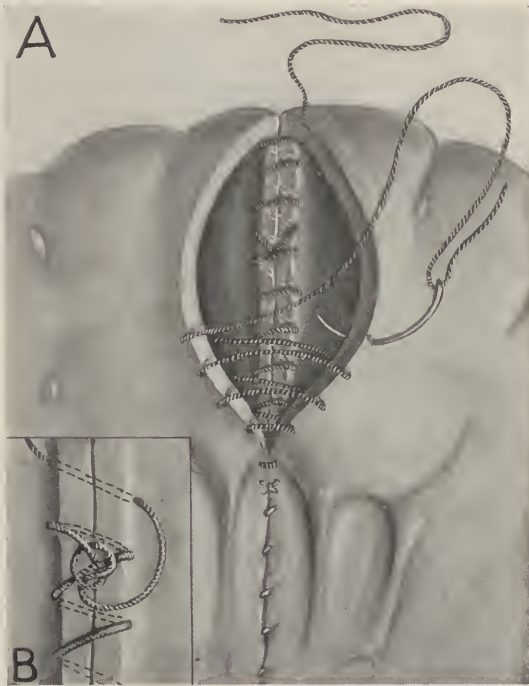


Fig. 977.—*A*, Glover's or whip-stitch; *B*, lock- or hitch-stitch.

verse or entire colon is resected, and in each instance extends from 3 inches above the umbilicus almost to the pubes.

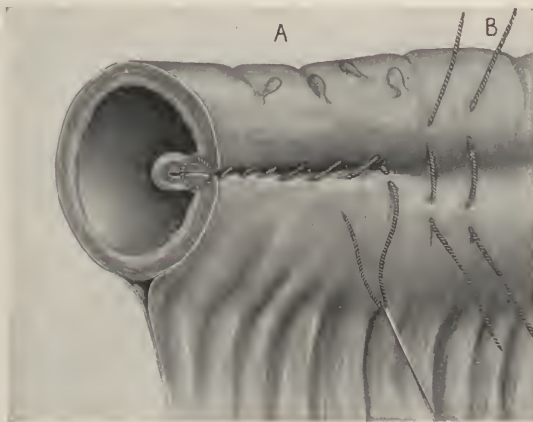


Fig. 978.—Lembert sutures: *A*, Continuous; *B*, interrupted.

Immediately upon entrance the abdomen is explored for malignant glands, metastases in other organs, and the neoplasm

examined to determine the nature and extent of the operation; following which the small intestine is packed off, wound edges protected with gauze pads, and held widely apart with self-retaining retractor (Fig. 986).

Cecectomy—Continuing Steps.—The outer leaf of peritoneum is incised (Fig. 985) and the cecum mobilized by wiping the peritoneal reflection, gut, fat, and glands toward the median line, exposing the *ileocecal* artery, which is ligated.

The cecum and lower ascending colon are freed and mobilized by ligating or dividing the mesentery between clamps, trianglewise, to include lymphatics.

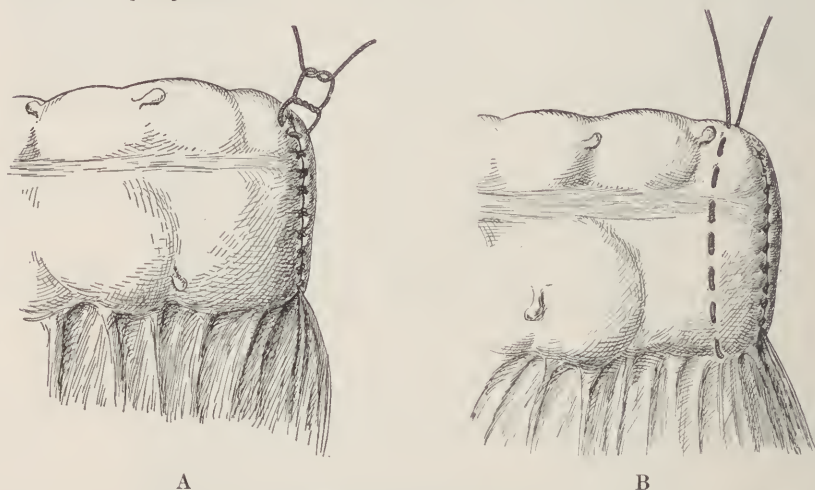


Fig. 979.—A, Closing of gut end with continuous through-and-through catgut sutures. B, Placing purse-string sutures.

The ileum is severed between clamps 3 inches below the valve with a cautery after being crushed (Fig. 971), following which the ascending colon is divided in a similar manner, which completely detaches the ileocecal angle.

The open ends of the colon and of the small intestine are inverted and closed by purse-string and infolding peritoneal sutures (Fig. 980). The proximal gut is then anastomosed with the colon—*ileo-colostomy*—at the desired point, using the implantation (Fig. 971) or *side-to-side* method with sutures (Fig. 966), or a Murphy button (Fig. 975) if haste is required.

The peritoneal rent is sutured with catgut (Fig. 971, right) and the abdomen closed, leaving a cigarette drain if there has been leakage of feces.

The technic for *colectomy*, where the ascending colon, hepatic

flexure, transverse colon, splenic flexure, or descending colon are removed, is practically the same as for cecectomy, except the *right*, *middle*, or *left colic* artery is tied (Figs. 968-970) and colonic ends are joined by end-to-end or side-to-side anastomosis, the former being preferable; or ileosigmoidostomy if colocolostomy be not feasible.

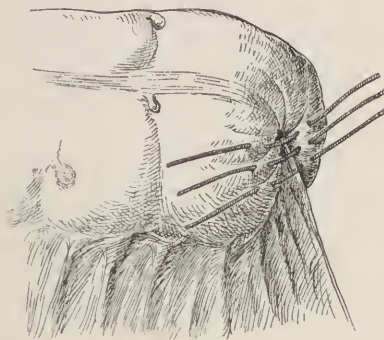


Fig. 980.—Burying mesentery and purse-string suture by infolding stitches.

Sigmoidectomy is more difficult than cecal or colonic extirpation because the growth is located in the pelvis in close proximity to the ureter, spermatic vessels, internal iliac arteries, and bladder, which makes dissection and suturing difficult, tedious, and dangerous (Fig. 986).

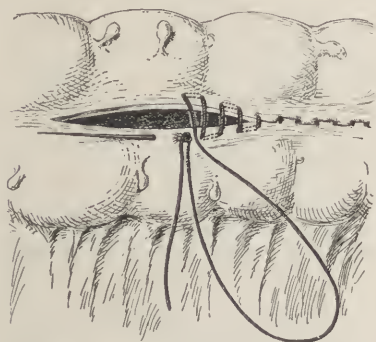


Fig. 981.—Cushing right-angle suture.

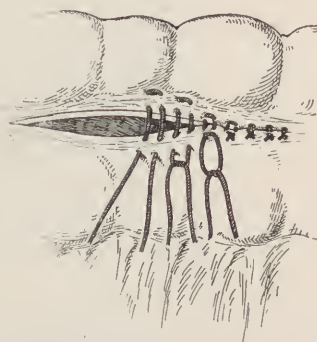


Fig. 982.—Halsted mattress suture.

The sigmoid is best mobilized by making a peritoneal incision through the outer leaf parallel with the gut (Fig. 985) and wiping gut free toward the median line, after which the sigmoid is retracted upward, while the inferior mesentery, sigmoidal, and superior hemorrhoidal arteries are doubly tied and cut, and lymph-glands and vessels from the sacral hollow to beginning of the inferior mesenteric artery are removed (Figs. 968, 986).

The sigmoid is extirpated with the cautery by dividing it above and below between double clamps (Fig. 986). The proximal is then anastomosed with the distal end, using through-and-through reinforced by peritoneal sutures, or large Murphy button, and the abdomen closed with cigarette drainage.

In difficult operations, to facilitate anastomosis and protect the suture line, a large firm rubber tube is inserted and anchored in the proximal segment of bowel with catgut, the other end of the tube is introduced into the rectum and brought out at the anus, and traction made upon it to approximate bowel ends while being

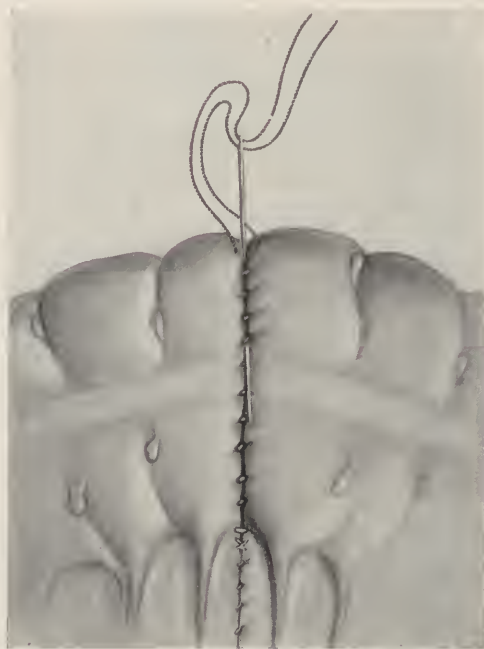


Fig. 983.—First step in burying last stitch inside the bowel to lessen danger from infection.

sutured. This procedure, suggested by Balfour, has been satisfactorily employed in several of the author's cases.

When wide excision prevents restoration of gut continuity both ends are sutured to the skin, or an artificial anus is formed with the upper, the lower being closed and replaced in the abdomen.

In urgent cases a *two-, three-, or four-stage* operation is justified, *i. e.*, the cancerous gut is (1) sutured outside, (2) to be amputated later, leaving the anus to be closed at a still later date by end-to-end union, or (3) extraperitoneally, when spur is divided with a



Fig. 984.—Final step in burying last stitch.

Gant valve clamp (Fig. 1078) or enterotome subsequently, and (4) freshening the edges of and closing the stoma (Fig. 1079) or

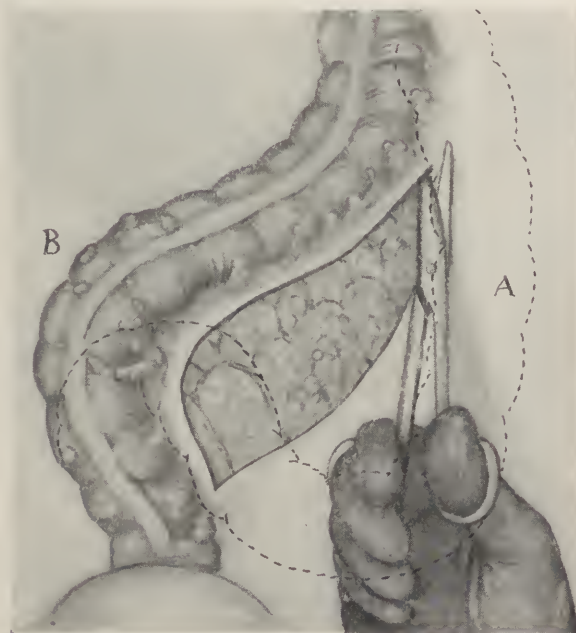


Fig. 985.—Mobilization of the sigmoid and descending colon in colectomy: *A*, Normal position; *B*, bowel displaced inward; *C*, outer leaf of mesocolon being incised with scissors, which facilitates mobilization of gut, ligation of vessels, and removal of lymph-vessels and nodes directly and indirectly draining the growth.

after the plan described and illustrated (Figs. 1076, 1080 in Chapter XCVI).

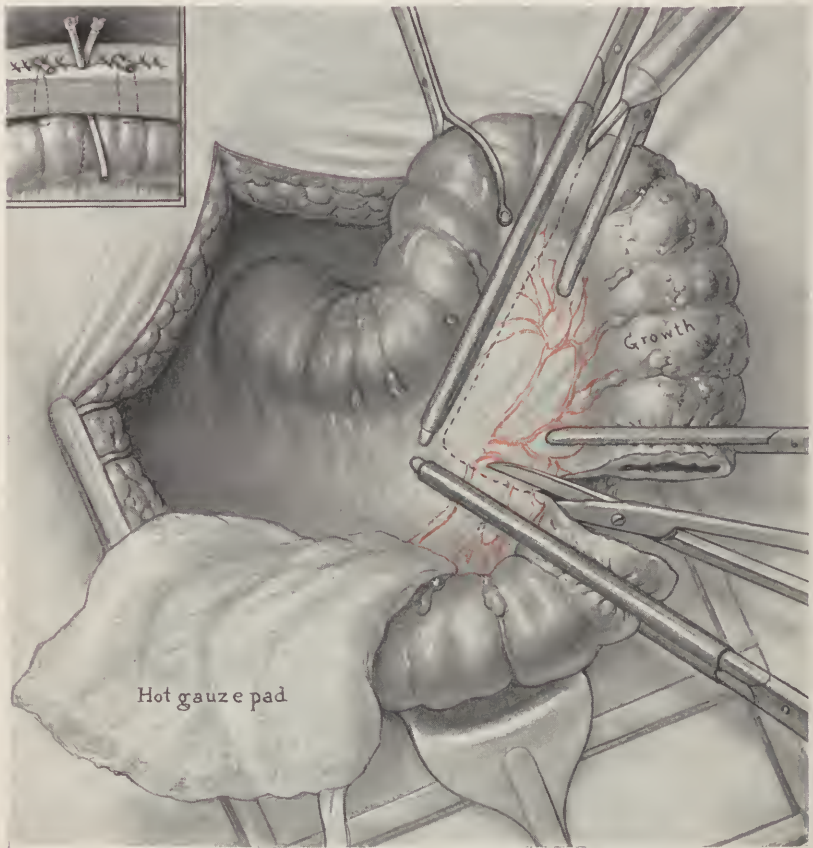


Fig. 986.—Block method of resecting the sigmoid flexure. The sigmoid and its mesentery are brought outside through a liberal median Kammerer or left rectus incision, lifted upward, doubly clamped above and below the growth, and resected with cautery and scissors by an incision made following dotted lines, which includes infected lymph-channels and nodes, blood-vessels draining the growth and fat in which they lie. *Insert* shows proximal and distal ends of bowel approximated by end-to-end anastomosis with through-and-through reinforced by superficial infolding stitches, the abdomen closed and drained, and the colon attached to the abdomen parietes parallel with the wound by *suspension* sutures tied across rubber tubing, which minimizes danger should leakage and infection occur.

The *postoperative treatment* of colectomy is the same as for proctectomy and the combined excision operation as described elsewhere.

Chapter XCIII

Cecostomy, Ileocecostomy—Gant's—Appendicostomy, Appendicocecostomy, Appendico-enterostomy

CHANGING INTESTINAL FLORA IN COLONIC INFECTIONS

History.—The operations mentioned in the chapter headings, now frequently employed in the treatment of infectious diseases, different forms of colitis, intestinal stasis with auto-intoxication, anemia, artificial feeding, and to facilitate drainage in cases of obstruction and colonic exclusion, etc., are comparatively new and were devised as a substitute for *enterostomy* and *colostomy* with their objectionable features performed for membranous colitis by Mayo Robson (1893) and Hale White (1895) that the inflamed colon might be irrigated and healed.

Prior to 1898 E. A. Corson suggested *appendicostomy*, in 1902 Gibson described his *valvular cecostomy*, and the same year Weir published his method of irrigating the colon through the appendix, which was designated *appendicostomy* by Willy Meyer.

The author (1908)¹ described his *ileocecostomy* (Fig. 988), which provides a means of separately or simultaneously flushing the colon and small intestine, and in 1910² modified the procedure by substituting his metal or soft-rubber enterocolonic irrigator (Figs. 989, 992) for ordinary catheters. In the same year he published the technic of his *appendicostomy* (Fig. 1007) and reported 105 cases of enterocolonic affections treated by appendicostomy, cecostomy, or his ileocecostomy, which have been incorporated in the accompanying table of cases treated by through-and-through medicated irrigation.

A summary of the author's contributions toward the *surgical treatment of diarrheal* and other bowel affections by enterocolonic irrigation introduced through the *appendix* or *cecum* or *colon* is given below:

1. Report 3 cases membranous coloproctitis cured by colostomy and irrigation (Gant, *Diseases of the Rectum and Anus*, 2d ed., p. 222, 1902).

2. Tubercular colitis cured by colostomy and irrigation with closure of the artificial anus at end of third year (Review of Reviews, October, 1900).

3. Report 9 cases dysentery and diarrhea treated by appendicostomy or cecostomy and irrigation (Boston Med. and Surg. Jour., September 6, 1906).

¹ New York Medical Journal, August 5, 1908.

² Interstate Medical Journal, vol. xvii, No. 9.

4. Report 35 appendicostomies and 12 cecostomies (New York Med. Jour., August 15, 1908).
5. Surgical treatment of diarrhea with description of new cecostomy which permits free irrigation of the small and large intestine (New York Med. Record, September 11, 1909).
6. Some Original Surgical Procedures. An address delivered before the Cleveland, Ohio, Academy of Medicine, November 19, 1909).
7. Cecostomy and appendicostomy in the treatment of intestinal affections; report of 105 cases of bowel diseases treated by the direct method (Interstate Med. Jour., vol. xvii, No. 9, 1910).
8. Constipation and Obstipation (Gant, 1910).
9. Analytical and Statistical Study of Bowel Diseases in Infancy and Childhood, etc. (American Medicine, June, 1911).
10. Intestinal Tuberculosis (The Post-Graduate, June 13, 1913).
11. Surgical Myxorrhoea, Coli-M. Membranacea and M. Colica (Surg., Gyn., and Obst., December, 1914).
12. Modernized Proctology (New York Med. Jour., January 16, 1915).
13. Diarrheal, Inflammatory, and Parasitic Intestinal Diseases, Gant, 1915 (including chapters on Appendicostomy, Cecostomy, and Enterocostomy, with report of 205 cases).
14. Numerous lectures (1916-1922) illustrated by motion pictures showing the technic, treatment, and postoperative results of appendicostomy, cecostomy, etc.

General Remarks.—Through-and-through irrigation by way of the appendix or cecum is indicated in colitis, intestinal stasis with auto-intoxication, and other colonic conditions not relieved or cured by *lavage* where the solution is introduced *per anum*, dieting, medication, rest, and change of climate and surroundings.

The desired amount of fluid is made to reach and cleanse lesions throughout the colon and rectum without discomfort by having it warm, requesting the patient to change from one position to another, and permitting the irrigation to escape through a special self-retaining anal irrigator (Fig. 1020) which prevents the solution from accumulating and causing distention and pain.

Irrigation by way of the anus is often impracticable because the solution does not come in contact with lesions in the cecum and upper colon, causes intense pain, or is expelled before passing the sigmoid flexure.

Appendicostomy and *cecostomy* take precedence over *enterostomy*—*ileostomy*, and *colostomy*—because evacuations take place through the artificial opening; skin around the aperture becomes excoriated (Fig. 1022), gas and feces escape involuntarily, patients object to location of the anus, and a dangerous secondary operation is required to eliminate the stoma, while appendicostomy and cecostomy openings are not complicated by leakage and are usually closed in the office by fulguration or cauterization.

Ileostomy (Chapter XCIV) is indicated to put the bowel completely at rest in severe cases of syphilitic, tubercular, hemorrhagic colitis, and other lesions involving the small intestine or colon when other therapeutic measures and appendicostomy and cecostomy with irrigation have failed.

In most instances shortly following appendicostomy or cecostomy and through-and-through irrigation inaugurated for colonic ulceration causing diarrhea or other affections named below, the patient ceases to have frequent movements, soon recovers his appetite, digests food better, gains rapidly in weight, is less nervous, rarely complains of pain, discharges less mucus, pus, and blood, seldom complains of tenesmus, has a more healthy color, cheerful appearance, and an inclination to be up and doing.

The author's patients have *all* been improved by appendicostomy and cecostomy and local bowel treatment, though in a few instances a cure was not accomplished because *position* of the patient was not changed during irrigation, the small intestine was extensively involved, the gut was strictured at one or more points, or disease in neighboring organs or elsewhere dominated the enterocolonic disease.

Frequently catarrhal and specific colitis is apparently cured within a month or six weeks, the patient looks healthy and eats what he pleases, but under such circumstances it is inadvisable to close the appendical or cecal opening earlier than from *three to six months*, for recurrence is likely in cases of entamebic, bacillary, or balantidic colitis because embedded—encysted—organisms may escape and reinfect the bowel.

Indications for Appendicostomy and Cecostomy.—These procedures were originated for and have been frequently and successfully employed in the treatment of *chronic diarrhea*—ulcerative colitis—characterized by stools containing an abundance of mucus, pus, and blood, the result of *catarrhal, tubercular, syphilitic, entamebic, streptococcic, bacillary, balantidic, helminthic, membranous, gonorrheal, hemorrhagic, or mixed infection colitis*.

Results from these procedures combined with irrigation have been remarkably good, and their field of usefulness has been extended until appendicostomy and cecostomy have been recommended or employed more or less frequently in the treatment of the numerous diseases and conditions enumerated below, viz.:

1. All forms of colitis.
2. Chronic ptomain poisoning.
3. Myxorrhoea membranacea and colica.
4. Ordinary and pernicious anemia.
5. Helminths.
6. Malnutrition—to facilitate artificial feeding.
7. Correct defective flora.
8. Intestinal fermentation and putrefaction—by washing out putrefying food remnants, bacteria, and toxins.

9. Colonic stasis with auto-intoxication—induced by ptosis, kinks, angulation, invagination, volvulus, Jackson's membrane, extracolonic pressure, Hirschsprung's disease, colonic dilatation, diverticulitis, etc.

10. Constipation with recurring coprostasis to relieve pain and colic from chronic gas distention.

11. Overcome deficient peristalsis by augmenting intestinal muscular contractions.

12. Paralytic ileus from colonic obstruction or operation.

13. Ileitis, where the small bowel is irrigated through a catheter introduced through the ileocecal valve.

14. Chronic intestinal obstruction in connection with colonic exclusion to insure drainage and forestall gas distention.

15. Rectocolonic carcinomata and adenomata complicated by inflamed or ulcerated mucosa, hemorrhage, or profuse discharge of pus, blood, and mucus, or offensive odor.

16. Tubercular peritonitis.

17. Diverticulitis and peridiverticulitis.

18. Pericolitis—resulting from colonic inflammatory lesions.

19. Mercurial chlorid poisoning.

20. Shock from operation or general debility to permit the projection of oxygen or saline solution into the colon.

21. Typhoid and other infectious fevers complicated by inflammatory and ulcerative enterocolonic lesions—using Gant's ileocecostomy with irrigation.

22. Appendicitis.

Appendicostomy and cecostomy have been employed by different operators as substitutes for gastrostomy, jejunostomy, colostomy, and Lane's colonic resection, colonic stasis following resection, intestinal exclusion and fixation of the bowel to the abdomen to prevent tension upon sutures from gas distention, provide drainage, and forestall the backing up of discharges and feces when the bowel has been short-circuited and as a preliminary procedure to resection for intestinal cancer, stricture, and ulceration. Ver Hoogan, following total cystectomy transplantation of both ureters into the cecum, performed appendicostomy to insure drainage.

Hollis, Ditmar, Burck, and the author have benefited cases of *pernicious anemia* with appendicostomy and cecostomy with through-and-through irrigation by flushing out intestinal toxins elaborated by colonic anaërobic bacteria.

The author has operated on many patients suffering from intestinal auto-intoxication, ulceration, or chronic obstruction

where ordinary *anemia* was a complication, and in every instance the condition was improved by bowel irrigation subsequent to appendicostomy or cecostomy. In 2 instances he relieved epileptics from recurring attacks for from eight weeks to six months.

Experiments have shown that predigested and other foods employed for artificial feeding are absorbed quickly and in larger amounts when projected into the colon through an appendical or cecal opening, and a saline solution introduced through the opening in large quantities or the drop method is helpful in peritonitis and shock.

Appendicostomy and cecostomy are beneficial because through their aid one can treat with hot or cold water, saline or medicated solutions, or oils *all parts of the bowel*, dislodge irritating foreign bodies, food and feces, wash out bacteria, toxins and foul discharges, heal ulcers, minimize auto-intoxication, diminish or stimulate peristalsis, change intestinal flora, arrest colic and pain, soothe inflamed mucosa, nourish debilitated patients, prevent or relieve gas distention and fecal impaction, increase the circulating media, rapidly diminish the number of evacuations of individuals afflicted with chronic diarrhea, and clear up auto-intoxication resulting from colonic stasis.

These procedures are also useful since they improve the psychic state of the patient, who is impressed by the operation and believes at last an effective plan of treatment has been instituted.

Comparative Advantages of Cecostomy and Appendicostomy.—Both operations deserve an important place in bowel surgery since each gives remarkably good results in suitable cases and mortality is low.

Advantages of *cecstomy* and *ileocecstomy*—Gant's—are: (1) the cecum is anchored without angulation; (2) the opening can be made of a suitable size; (3) an effective circular valve is formed around the tube to prevent leakage; (4) the catheter is easily changed; (5) pain is less than following appendicostomy owing to lack of tension; (6) there is no danger of sloughing since blood-vessels are not impaired; (7) closure of the opening follows withdrawal of the catheter and cauterization or fulguration; (8) following Gant's ileocecstomy lesions located in both the small and large intestine are irrigated, and (9) bacterial flora can be changed by projecting other organisms into the colon or small gut.

Disadvantages of cecostomy are comparatively few: mortality is higher than from appendicostomy because the bowel is opened and there is usually some leakage during operation, stitch abscesses are occasionally observed, there is slight escape of gas or

fluid feces about catheter or irrigator, and cecal are more difficult to close than appendical openings.

Advantages of appendicostomy are as follows: Technic is simple, the operation requires a short time, the appendix may or may not be opened during operation, skin abscesses are rare, mortality is exceedingly slight, excoriation of surrounding skin is seldom encountered, there is practically no involuntary escape of gas or feces, convalescence is prompt, results are remarkably good, and the opening can be closed in the office by fulguration.

Disadvantages of appendicostomy—some of which are unimportant—are: (1) It is sometimes difficult to locate and free the appendix owing to its position, short mesentery, or adhesions; (2) angulation may occur when the appendix is anchored; (3) the appendix may be short, small, strictured, ulcerated or obstructed by a foreign body, or be otherwise unfit for irrigation purposes; (4) the appendical opening sometimes closes before a cure is effected; (5) pain sometimes ensues due to traction on the appendix by an overloaded cecum or squeezing of the mesentery; (6) an intern has mistaken an aperture in the wound for that of the appendix and projected the solution into the abdomen; (7) appendicostomy has been spoiled by sloughing due to tension, constricting sutures destroying blood-supply of the appendix, or pressure of the catheter; (8) the operation is not applicable in enterocolitis; (9) ulceration—of the stump—requiring appendectomy has occurred; (10) traction on the meso-appendix occasionally causes nausea, pain, and gas distention; (11) feces and gas sometimes escape involuntarily when the appendical caliber is very large; (12) appendicostomy is impracticable in fat subjects when abdominal muscles are thick or the mesentery is short because the appendix cannot be sutured to the skin, and (13) the appendix may be congenitally absent or the result of operation.

The author has employed appendicostomy and cecostomy in adults, children, and infants, but the age of most patients ranged from twenty-five to forty years and more women were operated than men.

Mortality.—In recent years, since perfecting the technic elsewhere described, the author has had no mortality from either *appendicostomy* or *cecostomy*, but superficial wound infection occasionally followed the latter due to opening the cecum for insertion of the catheter. Death, however, may result in aggravated cases from exhaustion, sepsis, hemorrhage, or some complicating disease.

That the reader may obtain a knowledge of the comparative frequency with which appendicostomy, cecostomy, and Gant's

SYNOPSIS OF THE AUTHOR'S APPENDICOSTOMIES, CECOSTOMIES, ILEOCECOSTOMIES, APPENDICOCOSTOMIES,
AND APPENDICO-ENTEROSTOMIES WITH DISEASES AND CONDITIONS FOR WHICH THE OPERATIONS WERE PER-
FORMED

Diseases and conditions for which operation was performed.	Total each operation.																									
	Colitis—catarrhal, amebic, bacillary, tubercular, luetic, balantidic, etc.	Ilcoecolitis—catarrhal and infectious.	Adenomata and papillomata—polyposis.	Chronic plomatin poisoning.	Hemorrhagic colitis.	Myxorrhoea membranacea and colica.	Helminths—pin- and tapeworms.	Pernicious anemia.	Ordinary anemia.	Chronic fecal impaction.	Correct defective intestinal flora.	Colonic putrefaction.	Constipation with auto-intoxication.	Hirschsprung's disease.	Chronic colonic dilatation.	Malnutrition—to inject nutriment.	Conjunction with intestinal exclusion—for obsti- pation and colonic stasis.	Conjunction with sigmoidopexy for chronic in- vagination into rectum.	Tubercular peritonitis.	Paralytic ileus.	Pericolitis.	Appendicitis.	Preliminary to rectocolonic exclusion and resec- tion.	Shock from serious intestinal operations—saline irrigation.	Conjunction with obstipation—for kinks, twists, pneosis, adhesions, etc.	Recto- or colonic stricture.
Type of operation.....	..	..	..	..	..	..	..	..	1	2	3	1	2	1	2	1	7	3	1	1	2	1	1	1	10	2
Appendicostomy.....	128	..	7	4	2	9	1	..	1	2	3	1	2	1	2	1	7	3	1	1	2	1	1	1	10	2
Author's stab-wound—or Gibson's— cecostomy.....	23	..	2	..	1	4	..	..	..	..	1	..	1	..	..	..	2	1	..	1	..	..	1	5	1	44
Author's ileocecostomy.....	10	9	1	1	1	1	1	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	1	1	26
Appendicocostomy.....	6	..	1	..	..	1	..	1	1	1	1	..	..	..	..	..	1	..	..	..	1	..	..	1	1	13
Appendico-enterostomy.....	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Number of cases in each disease.....	168	9	11	6	4	15	2	..	2	2	5	1	3	1	3	1	10	4	1	2	2	1	2	17	3	277

ileocecostomy are indicated, and variety of diseases and conditions for which operations were performed the author has compiled the table shown on p. 371 giving a synopsis of his cases.

Gant's Cecostomy—Ileocecostomy—with an Arrangement for Irrigating the Small Intestine and Colon.—Having observed appendicostomy with irrigation fail to arrest hemorrhage, stop

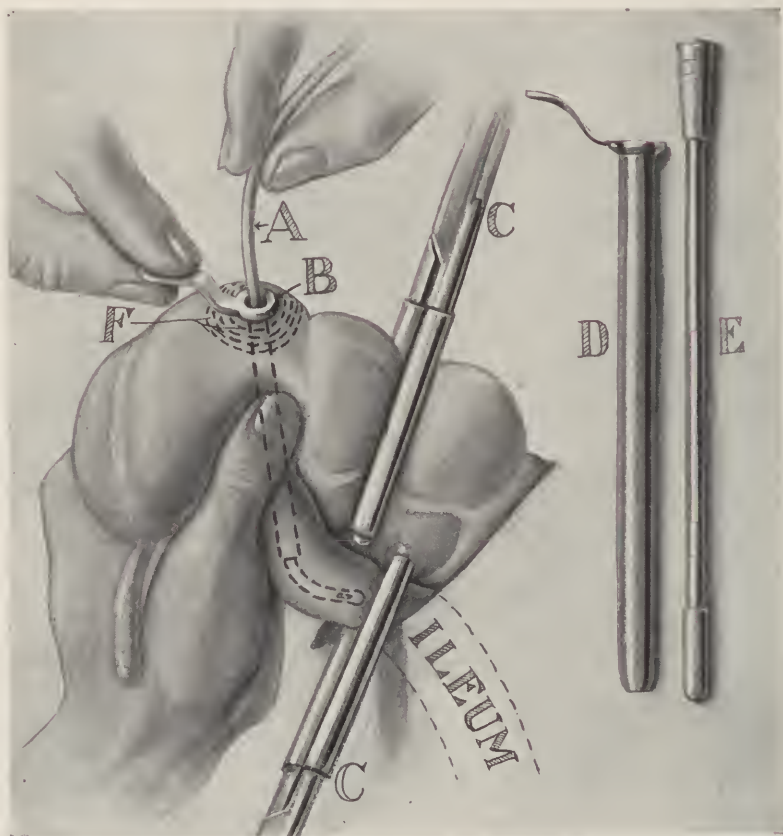


Fig. 987.—First steps in Gant's original ileocecostomy which permits separate or simultaneous irrigation of the small intestine and colon: A, Catheter introduced through cecum and ileocecal valve into ileum; B, catheter guide through which it passes *in situ*; C, intestinal clamps; D, catheter guide; E, obturator; F, purse-string sutures.

discharges, and control chronic diarrhea due to catarrhal, tubercular, luetic, streptococcic, entamebic, or balantidic enterocolitis, the author devised his ceco-ileostomy—taking advantage of the cecal valve—that irrigating solutions might be carried to lesions in both the small and large intestine, a procedure that has met expectations.

Appendicostomy or cecostomy is substituted for this operation for ulcerative lesions *limited to the colon*, since irrigation of the ileum is unnecessary.

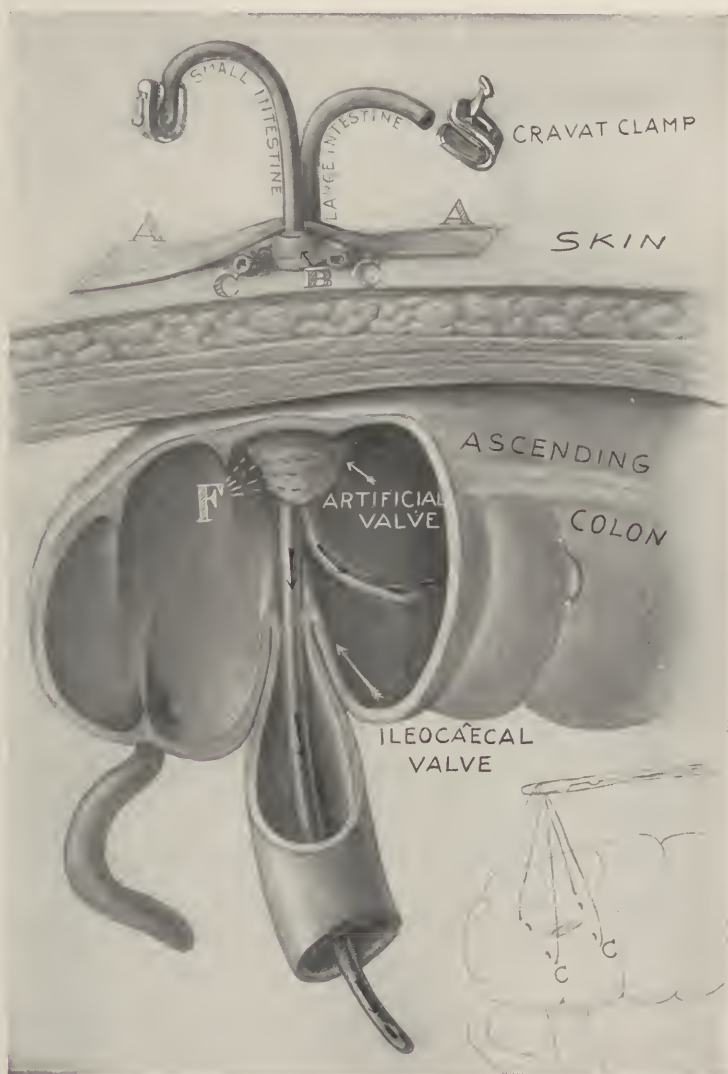


Fig. 988.—Final steps in Gant's original *catheter* ileocecostomy which permits separate or simultaneous irrigation of the small intestine or colon: *A* and *B*, Adhesive strips retaining catheters in position; *C*, rubber tubings supporting suspension sutures; *F*, circular valve formed about catheters to prevent leakage by infolding purse-string sutures. Insert shows method of introducing suspension stitches.

Briefly described, the following comprise the steps in the author's ileocecostomy (Figs. 987, 988): (1) Through a 2-inch

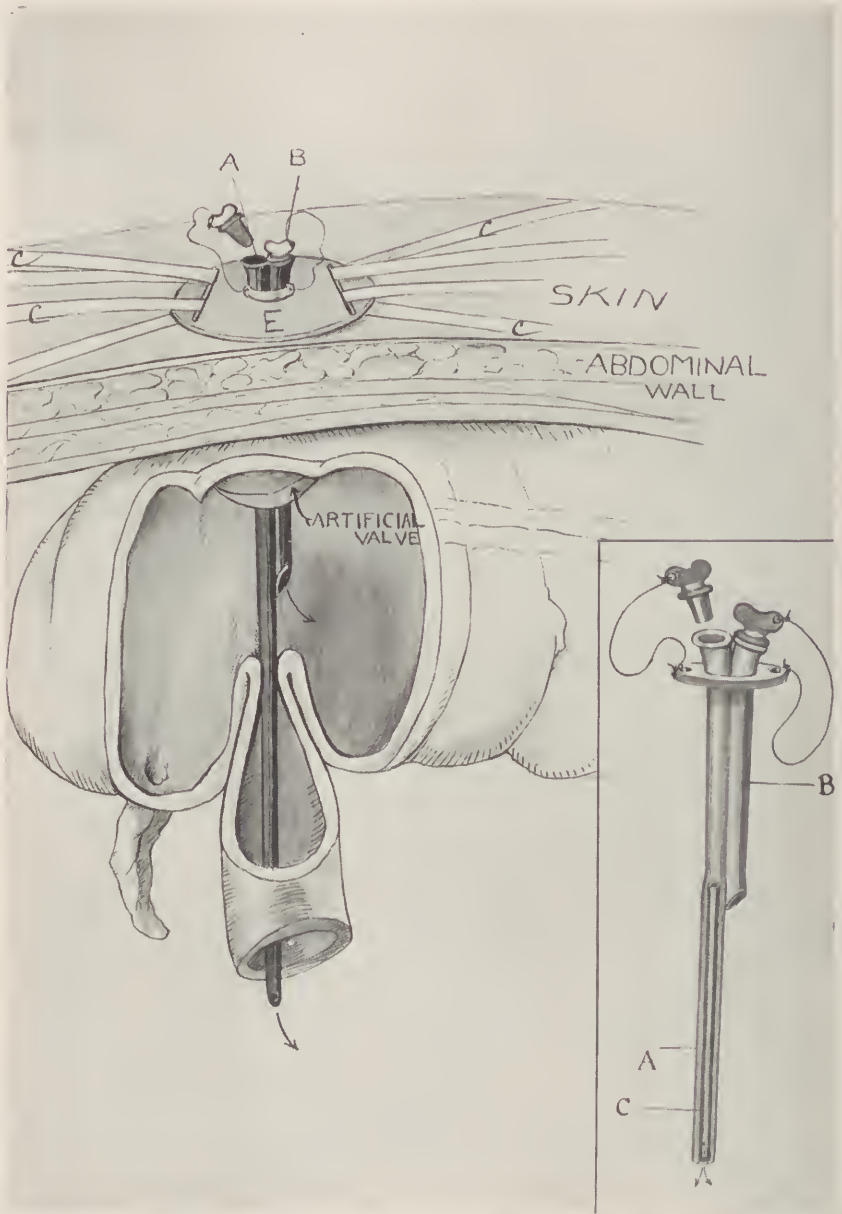


Fig. 989.—Gant's *new catheter* ileocecostomy where his special soft-rubber catheter is employed: *A*, Irrigator; *B*, stopper; *C*, adhesive strips; *E*, catheter-retaining shield. Insert shows: *A*, Special catheter; *B*, cecal tube, and *C*, pipe through which the solution enters the ileum.

(5.08 cm.) intermuscular or right rectus incision the ileocolic angle is withdrawn and wound edges protected with gauze handkerchiefs; (2) ascending colon and ileum are clamped to prevent soiling of the wound when the bowel is opened, and the cecum scarified; (3) linen purse-string sutures (Fig. 987) are introduced opposite the ileocecal valve and the gut opened inside the suture line; (4) holding the bowel so the ileocecal valve rests between thumb and fingers of the left hand (Fig. 987) a Gant catheter guide (Fig. 987, *B*) is passed across the cecum through the ileocecal valve into the small intestine; (5) the obturator is removed and a catheter passed through the guide into the small bowel (Fig. 987), to which it is anchored by catgut sutures; (6) a short piece of tubing is projected into the cecum beside the catheter and fixed; (7) infolding purse-string sutures are tied, forming a cone-shaped valve about the catheters (Fig. 988), which prevents leakage of gas and feces; (8) clamps are removed and the cecum anchored to the transversalis fascia, denuded of

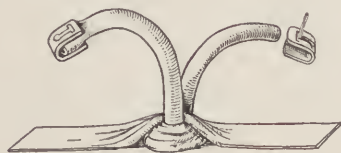


Fig. 990.—Author's method of retaining catheters in position with adhesive strips and closing them with cravat clamps.

peritoneum, by suspension sutures passed through the abdominal wall and tied across rubber tubing (Fig. 988); (9) the wound is closed and catheters anchored by skin sutures or an encircling crossed by a second adhesive strip (Fig. 990, *C*); (10) catheters are closed with cravat clamps to prevent leakage (Fig. 988), and the operation completed by applying gauze pads about the tubes and over the wound.

Catheters are then marked, so the intern and nurse may know which is in the large and which in the small intestine when time for irrigating arrives.

To avoid wound infection flushing is not begun for a few days unless diarrhea, hemorrhage, or toxic manifestations are alarming. To facilitate his operation, dispense with soft catheters that might be expelled by peristaltic contractions, and insure the solution's entering and being retained in the small intestine the author devised an *enterocolonic irrigator* (Fig. 992) used to advantage in several cases.



Fig. 991.—Appearance of wound and catheters in position closed by cravat clamps, following the author's double catheter ileocecostomy.

When the irrigator is in position the inflated bag in the small gut rests against the ileocecal valve (Fig. 993, *D*), and when distended

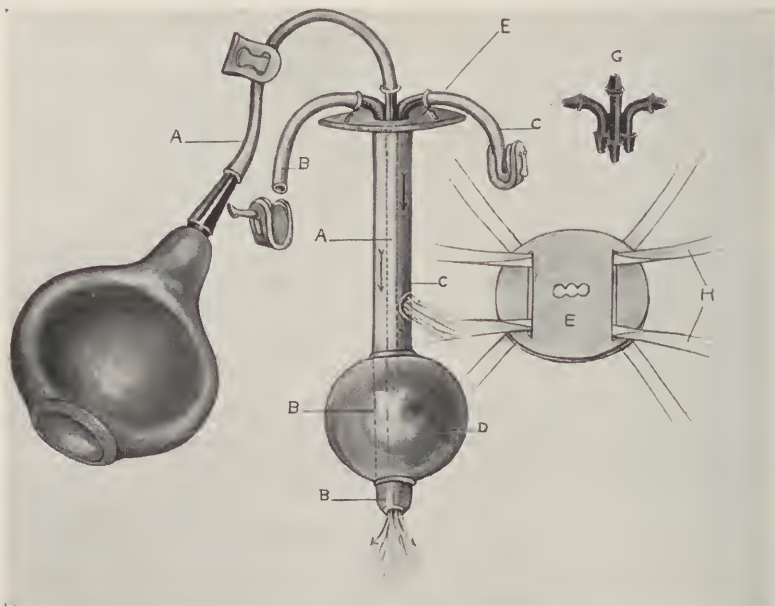


Fig. 992.—Author's soft-rubber enterocolonic irrigator employed in preference to catheters in his ileocecostomy: *A*, Inflating tube; *B*, pipe leading to ileum; *C*, colonic tube; *D*, inflated bag; *E*, retention shield; *G*, hard-rubber detachable connection; *H*, adhesive strips. Cravat clamps are employed to close the irrigating tubes.

temporarily prevents escape of the irrigant from the small bowel into the cecum.

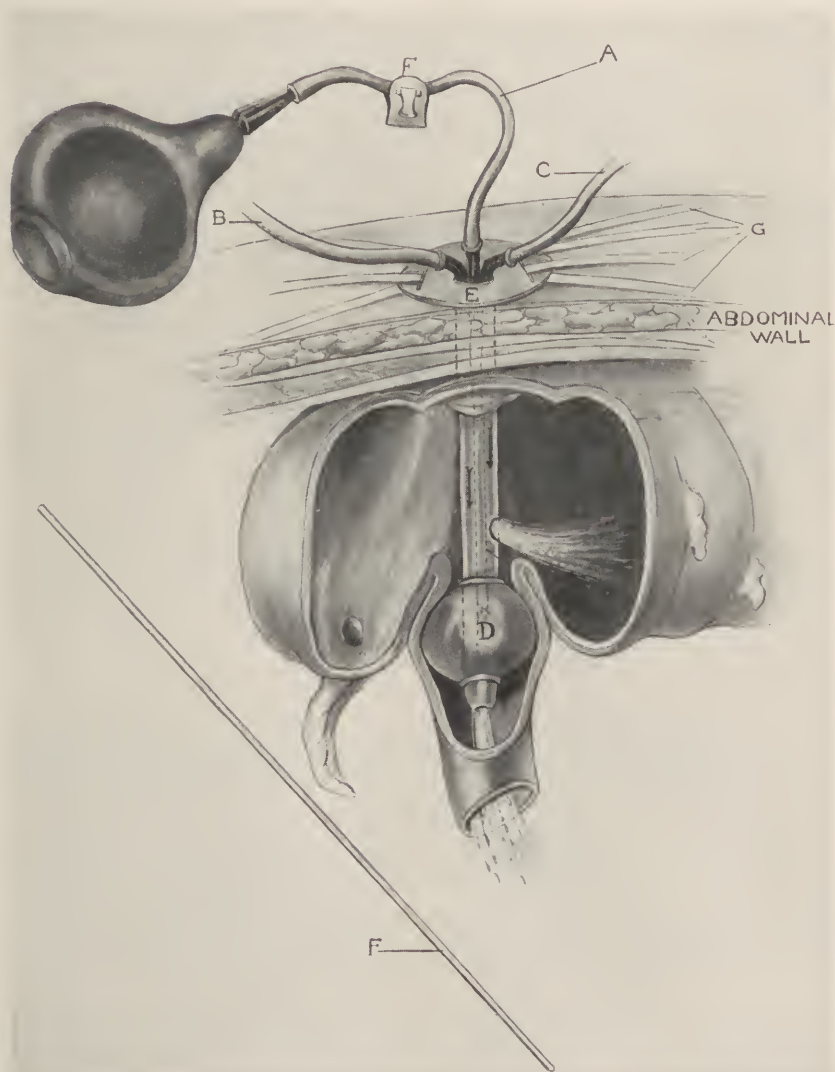


Fig. 993.—Ileocecostomy: Gant's enterocolonic irrigator in position: A, Inflating tube; B, pipe leading to small intestine; C, colonic tube; D, inflating bag; E, retaining shield; F, cravat clamp closing tube; G, adhesive strips.

With this twin tube irrigator constructed of silver or preferably soft rubber (Fig. 992), the small and large intestine are *separately* or *simultaneously* irrigated by physician, nurse, or patient.

Steps in the author's cecostomy when the irrigator is used is the same as when two tubes are employed, except a catheter guide is unnecessary.

When necessary catheters are changed by withdrawing the old and inserting a new cecal tube, following which the catheter guide is passed through the pipe in the small intestine, which is then removed and replaced.

Before adopting the above technic the author irrigated the small intestine through a glass or silver catheter introduced through the cecal opening, and then the ileocecal valve, an impracticable procedure because difficult, and the patient cannot irrigate himself.

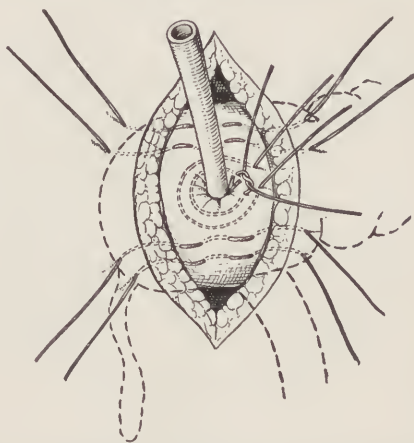


Fig. 994.—Author's method of introducing purse-string infolding and suspension sutures in ordinary cecostomy where a single catheter is employed. The circular valve thus formed about the catheter prevents leakage on all sides.

The author's is preferable to Gibson's cecostomy (Fig. 996) because of its simple technic, there is less leakage owing to infolding purse-string being substituted for lateral sutures, and it enables the attendant to irrigate lesions in both the large and small bowel.

Ordinary Cecostomy.—When performing *ordinary cecostomy* (Fig. 994) for ulcerative colonic lesions, or after the catheter has been introduced and anchored to the cecum by burying it for an inch with a running suture (Fig. 995) to prevent leakage, the catheter is brought out through a *stab wound* and anchored (Fig. 997), following which the incision is closed. In this procedure neither catheter nor irrigator pass through the ileocecal valve into the small bowel.

Annoyance and danger from leakage, sloughing, and peritonitis is diminished by making a small cecal opening and using three purse-

string infolding sutures. The cecum is never anchored to the skin as in Gibson's operation (Fig. 998) because sloughing often ensues,

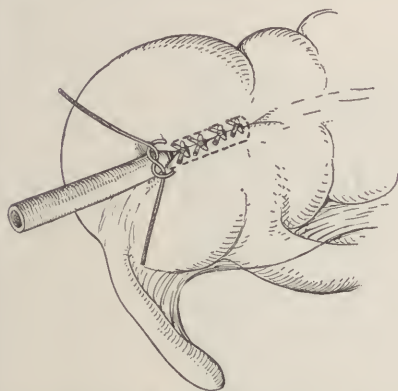


Fig. 995.—Method of angulating catheter by suturing the cecum over it to minimize leakage.

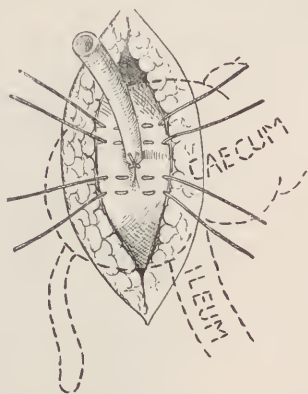


Fig. 996.—Gibson's cecostomy, in which stitches are placed on but two sides of the catheter. It is occasionally followed by leakage.

feces and gas involuntarily escape, and a second serious operation is required to close the opening, when if the *caput coli* had been anchored to the inner abdominal parietes (Fig. 997) the tract

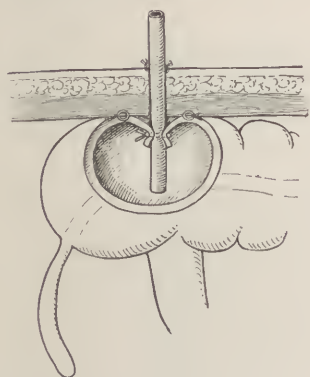


Fig. 997.—Right way of performing ordinary cecostomy by carrying catheter through the abdominal wall to the cecum. This prevents leakage and the stoma closes when the catheter is withdrawn and the opening is treated by fulguration.

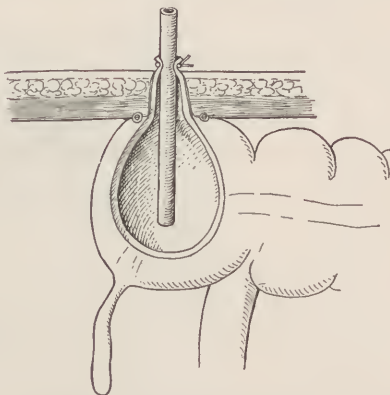


Fig. 998.—Wrong way of performing cecostomy, the cecum being sutured to the skin, which is followed by the escape of gas and feces beside the catheter, and requires a second serious operation to close the opening.

leading to and opening in the bowel would have closed if cauterized or fulgurated with a high-frequency current.

Author's Stab-wound Cecostomy.—In this procedure, after the cecum has been reached and brought out through a right rectus incision (Fig. 994), it is opened and a catheter is introduced and fixed by tying infolding purse-string sutures about it (Fig. 994);



Fig. 999.—Cecostomy: Appearance of cecum inverted about the catheter caused by tying of the purse-string sutures in the author's stab-wound cecostomy.

the catheter is then withdrawn through a stab wound with forceps (Fig. 1000), and the skin snugly adjusted about it with two linen angle sutures as in appendicostomy (Fig. 1005), following which cecal suspension sutures are tied about rubber tubing (Fig. 994).



Fig. 1000.—Cecostomy: Appearance of dressing and catheter closed by a cravat clamp at completion of the author's stab-wound cecostomy and appendicostomy.

The operation is completed by closing the main abdominal incision and placing dressings in such a manner that the catheter is left projecting through them for irrigating purposes (Fig. 1000).

Author's Appendicostomy.—Steps in the operation vary, depending on whether the patient suffers from *mild* or *severe* chronic

diarrhea—colitis—accompanied by frequent exhausting evacuations, profuse hemorrhage, and foul discharge. In the former simple appendicostomy is performed, since there is no occasion for immediate irrigation, while in the latter the appendix is open during operation and a Gant soft-rubber appendical irrigator (Fig. 1009) is introduced, and the bowel immediately irrigated to relieve dis-

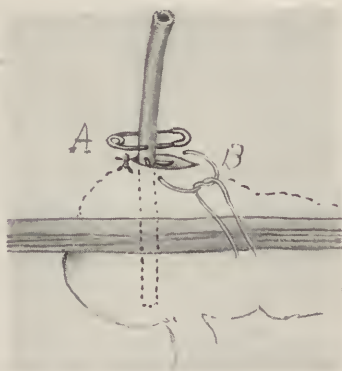


Fig. 1001.—Methods of preventing catheter (A) from slipping into or (B) out of the cecum.

treasing symptoms. Stitch abscesses occur more frequently from the latter than the former operation because the appendix is opened before the stab and abdominal incisions have healed.

Author's Simple Stab-wound Appendicostomy.¹—Technic.

(1) The abdomen is opened by a 3-inch (7.62 cm.) incision at the outer border of the rectus, the muscle is retracted inward, and

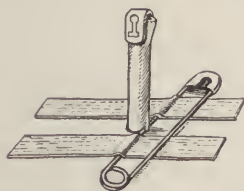


Fig. 1002.—Method of closing and retaining catheter in appendix or cecum with cravat clamp, adhesive strips, and safety-pin.

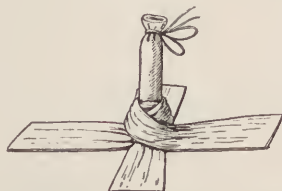


Fig. 1003.—Author's method of retaining and closing catheter with adhesive strips and ligature.

wound edges protected with gauze handkerchiefs; (2) the cecum and appendix are located, freed, brought to the surface, and cecal suspension sutures introduced; (3) the cecum is scarified, the appendix straightened by dividing adhesions and mesentery at a safe distance from the main artery, and suspension stitches

¹ Creisler and Pettyjon suggested bringing out the appendix through a stab wound.

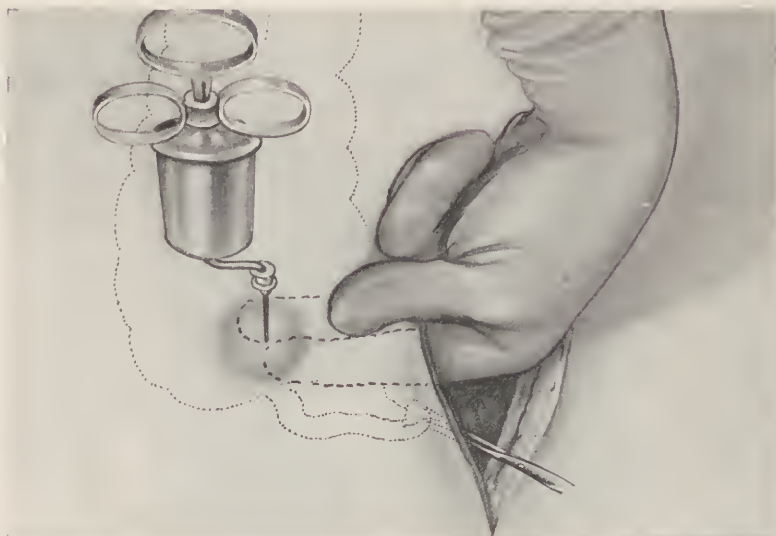


Fig. 1004.—Plan of anesthetizing abdominal structures for buttonhole incision and method of protecting intestine with fingers in the author's local anesthesia stab-wound appendicostomy.

placed 1 inch (2.54 cm.) apart are carried through the abdominal wall of the cecal region with a special long handle needle (Fig. 1007);

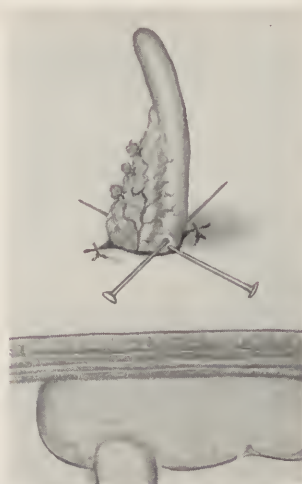


Fig. 1005.—Method of ligating mesentery and anchoring and suturing the appendix to the skin in the author's local anesthesia stab-wound appendicostomy.

(4) with first and second fingers introduced as a guide a free stab wound is made in through the abdominal wall, and appendix is withdrawn through it with the aid of long curved forceps (Fig. 1005);

(5) suspension sutures are tied across rubber tubings, angle stitches of linen or chromic gut are introduced and tied on either side of the appendix, and the abdominal wound closed (Fig. 1007); (6) the appendix is then bent over—unless amputated—or curled, and covered first with rubber tissue, smeared with vaselin and gauze, and the operation completed by placing outer dressings over the stab and abdominal wound previously closed.

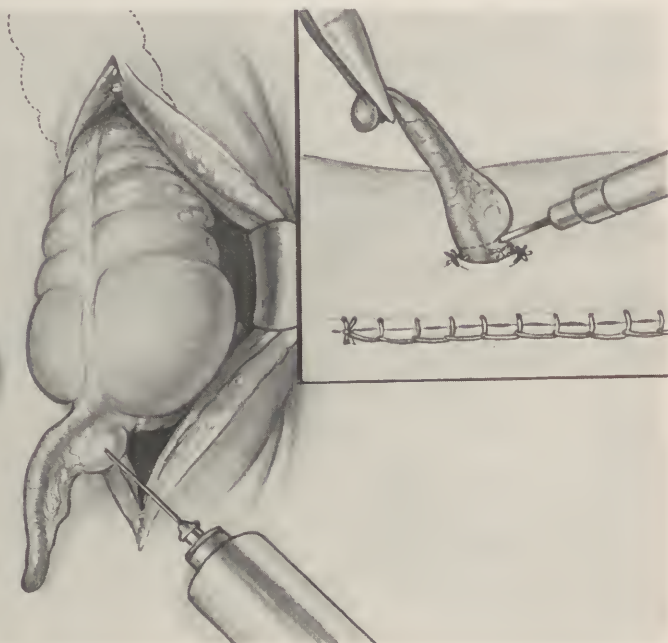


Fig. 1006.—Technic of author's local anesthesia stab-wound appendicostomy following infiltration of abdominal structures by the layer method shown in preceding illustrations (see chapter on Anesthesia). The cecum is brought out through a Kammerer incision and appendix desensitized by infiltrating its mesentery. Skin, fat, fascia, muscles, and peritoneum are separately infiltrated for the buttonhole incision as the stab wound is made (Fig. 1004), the intestine being protected from injury by fingers introduced through the original incision. Insert shows appendical mesentery ligated, buttonhole wound closed, and appendix being excised with Paquelin cautery.

Author's Appendicostomy Where His Irrigator is Employed.—

The steps in this are the same as in the preceding operation up to the time the appendix is brought and anchored in the stab wound and the abdominal incision closed. After the parts have been protected with gauze the appendix is opened and probed for a kink, foreign body, stricture, or ulceration that might interfere with subsequent colonic flushing.

The appendix is then amputated a short distance above the

skin, bleeding is arrested, and the appendical irrigator (Fig. 1008) with stopper in place is inserted and anchored by a linen suture

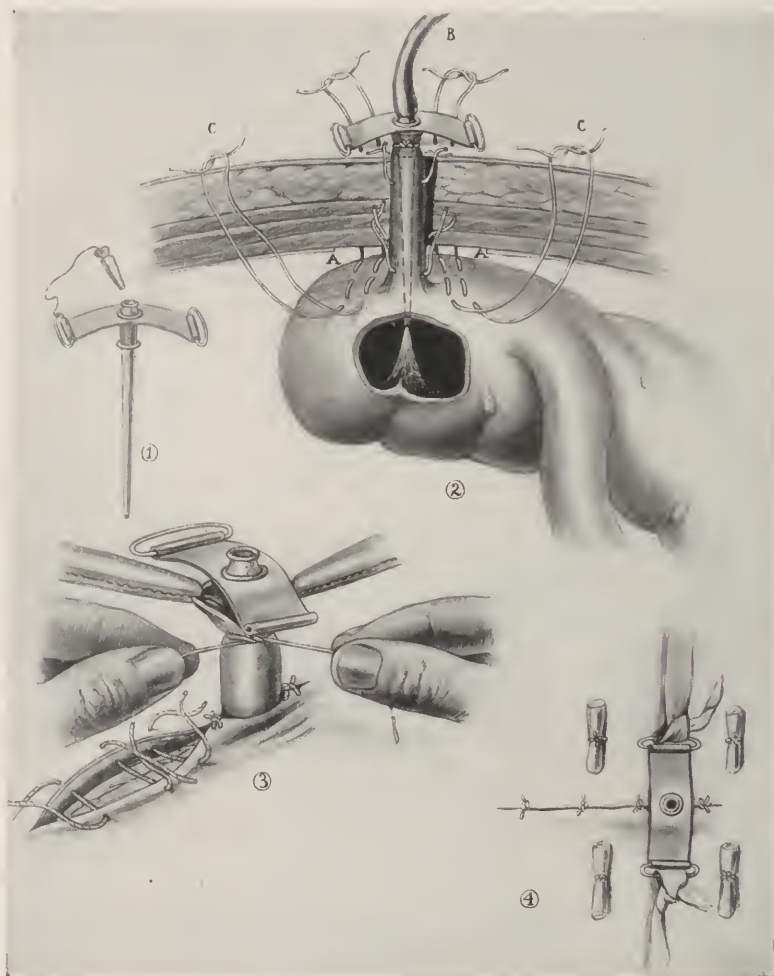


Fig. 1007.—Appendicostomy: Steps in author's local or general anesthesia appendicostomy when immediate irrigation is practised: 1, Gant's silver appendical irrigator. 2, Cecum and appendix in position: *A*, Peritoneum removed and gut brought in contact with transversalis fascia; *B*, irrigating tube; *C*, suspension sutures. 3, Ligation of appendix about irrigator and closure of wound. 4, Appearance of wound, suspension stitches, irrigator, and retaining adhesive strips. In this procedure the appendix may be brought out through an intermuscular incision or stab wound.

placed about the projecting rim of the instrument. The stopper is removed and the colon immediately irrigated, or in less urgent cases a tube is attached to the irrigator and carried to the outside,

which permits irrigation of the large intestine at any time without disturbing dressings (Fig. 1000).

The author's *simple* is performed more frequently than his appendicostomy where the irrigator is employed because for antiseptic reasons it is advisable not to immediately open the appendix except in deplorable cases of diarrhea with hemorrhages demanding immediate through-and-through colonic lavage.

In simple appendicostomy the appendix is open about the fifth day, when the surrounding wound is sealed and is left projecting $\frac{1}{4}$ inch (6.35 mm.) above the skin that the *appendical* may not be mistaken for an *opening at the side* of the appendix.

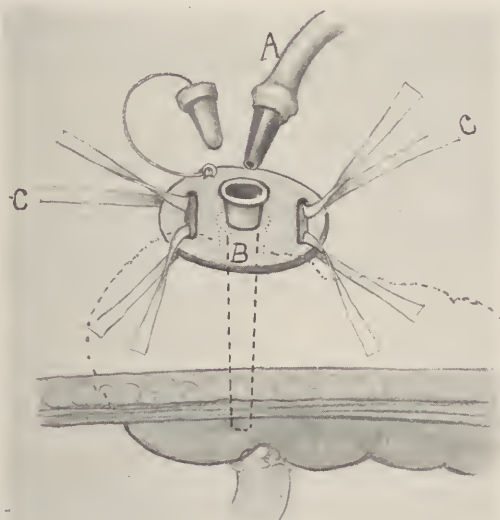


Fig. 1008.—Method of irrigating the colon through the author's soft-rubber appendical irrigator: A, Irrigating tube; B, irrigator; C, adhesive strips.

and the irrigant projected into the peritoneal cavity, as occurred with fatal results in the author's case being irrigated by an intern.

The author's irrigator is substituted for a catheter in ordinary appendicostomy because it keeps the opening sufficiently large and the stopper prevents leakage.

Originally the irrigator was made of silver, but of late years a soft-rubber irrigator (Fig. 1009) has been employed because it is more pliable, induces less discomfort, and cannot cause intestinal perforation should overlying dressings press firmly upon it. If the appendical opening shows no tendency to close, the catheter or irrigator may be dispensed with.

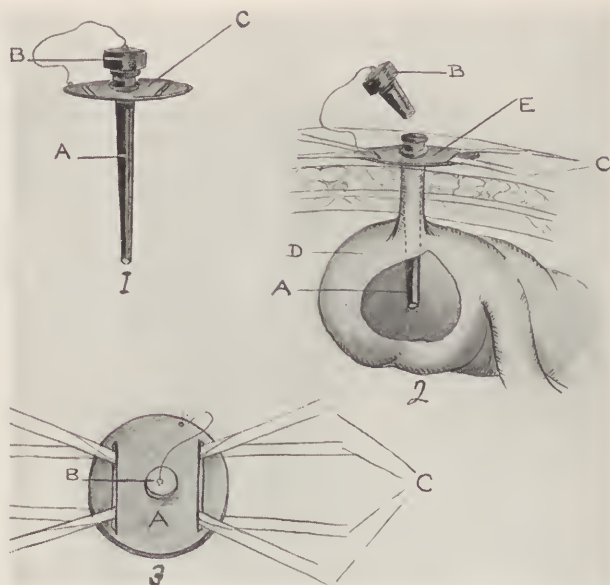


Fig. 1009.—Appendicostomy: *A*, Author's local anesthesia stab-wound appendicostomy operation when his soft-rubber is substituted for the metal irrigator, which sometimes causes discomfort. 1, *A*, Author's soft-rubber appendical irrigator; *B*, stopper; *C*, retention shield. 2, *A*, Appendical irrigator; *B*, stopper; *C*, adhesive strips fastening shield to the skin; *D*, cecum. 3, Appearance of irrigator at completion of operation: *A*, Retaining shield; *B*, stopper; *C*, adhesive strips.

The *intermuscular* (Fig. 1007) has been abandoned in favor of the *rectus* (Fig. 1004) and separate stab-wound incisions (Fig.



Fig. 1010.—Appearance of opening in successful appendicostomy.

1005) because infection occurring in the former is extensive and in the stab wound unimportant.

Appendicocostomy.—The procedure (Fig. 1013) consists in introducing irrigator or catheter through the *appendical stump* into the cecum as a substitute for appendicostomy where the

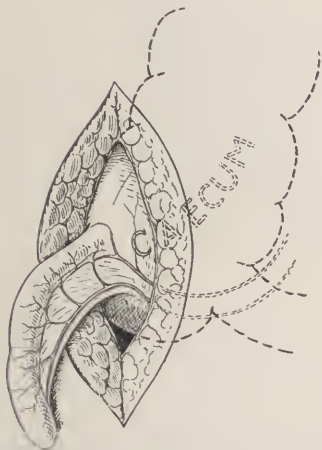


Fig. 1011.—Right way of dealing with mesentery in appendicostomy to prevent sloughing following suturing appendix to the skin.

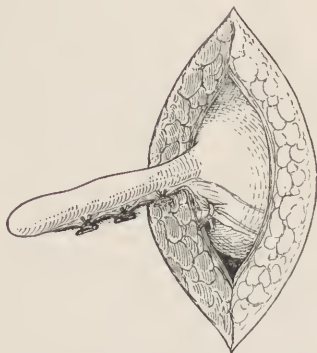


Fig. 1012.—Wrong way of dealing with mesentery in appendicostomy. When all vessels are ligated and mesentery adjacent to the appendix is divided, *sloughing* of the appendix usually ensues.

appendix has been examined and found impracticable for irrigating purposes because it was too short, narrow, kinked, strictured, or otherwise diseased.

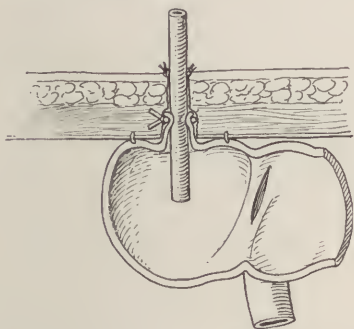


Fig. 1013. — Appendicocostomy: Method of introducing catheter into appendical stump when the appendix is strictured or otherwise unsuited for irrigating purposes.

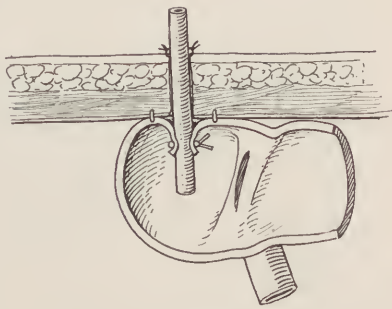


Fig. 1014.—Appendicocostomy: Catheter introduced through inverted appendical stump.

Appendico-enterostomy.—In this operation, suggested by Keetley, the central segment of the appendix is sutured to the skin and



Fig. 1015.—Cecostomy: Manner in which appendicostomy and cecostomy openings are closed by electrocauterization or fulguration.

opened after its distal end has been amputated and anastomosed with the lower ileum—an impracticable procedure.

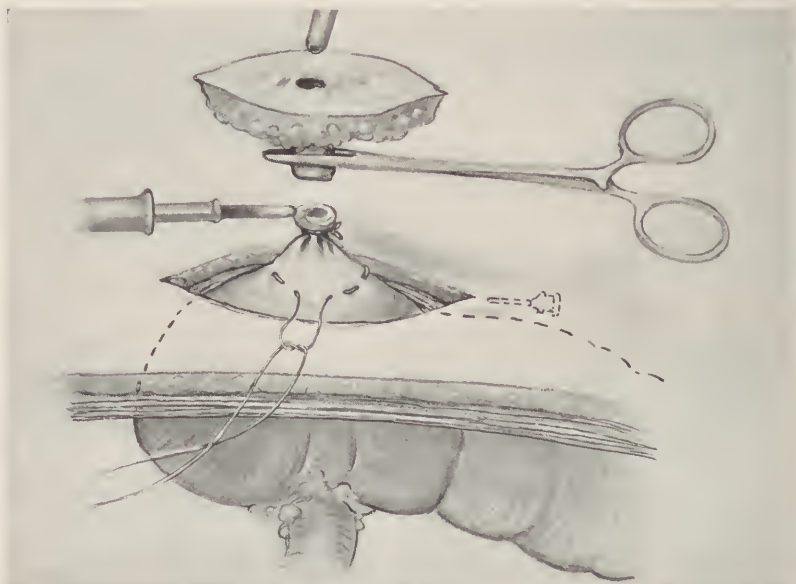


Fig. 1016.—Closing cecostomy opening: Author's local anesthesia extraperitoneal method of closing cecostomy and appendicostomy openings when fulguration fails to obliterate the stoma. *First steps:* Stoma and fistula are freed and brought outside through an elliptic incision; the fistula is doubly clamped, ligated, and divided with a cautery, following which the stump is inverted with a purse-string suture.

Closure of Cecal and Appendical Openings.—The appendical or cecal aperture may be closed in two or three in *mild*, and six months in *deplorable* cases of catarrhal and infectious colitis with mixed

infection, but to do so earlier is a mistake because recurrence occasionally occurs, though diarrhea, hemorrhages, discharges, and auto-intoxication have apparently been cured.

Frequently the opening closes spontaneously following withdrawal of the catheter or irrigator, but when it does not, destruction of mucosa with cautery (Fig. 1015), chemical caustics, or, preferably, by *fulguration* usually seals the appendical or cecal opening.

When the stoma cannot be obliterated in this manner appendectomy is performed extraperitoneally under local anesthesia or the cecum is exposed and the opening is closed by an infolding suture under eucain anesthesia without entering the peritoneum (Fig. 1017).

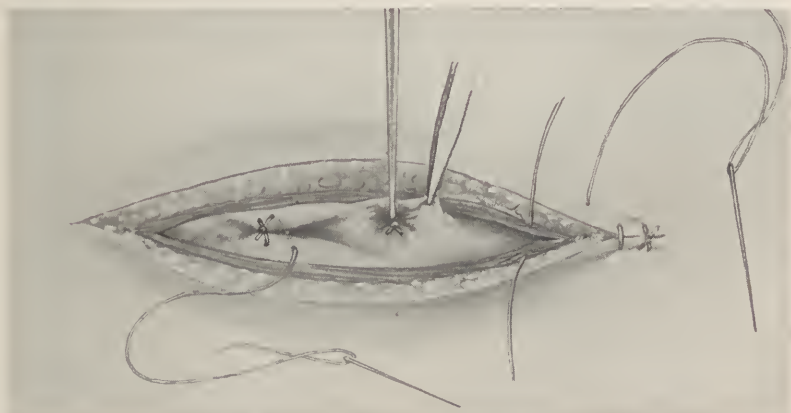


Fig. 1017.—Closing cecostomy opening: Author's local anesthesia extraperitoneal method of closing cecostomy and appendicostomy openings when fulguration fails to obliterate the stoma. *Final steps:* The cecum is infolded over the buried stump of the fistula or appendix and abdomen closed by the layer method.

When the opening exhibits a tendency to close before a cure has been accomplished it should be occasionally stretched with an appendical dilator (Fig. 1018).

Irrigating Solutions.—The beneficent action of through-and-through colonic irrigation is due almost as much to *mechanical* action of the fluid in cleansing the inflamed and ulcerated mucosa of irritating feces, discharges, and pathogenic organisms as to the contained *medication*.

Catarrhal colitis rapidly improves following daily flushing with normal saline, but when there is more or less ulceration, hemorrhages, abundant discharge, and frequent evacuations stimulating antiseptic and astringent irrigations are employed morning and afternoon until improvement is marked, when once daily suffices.

In neglected cases the author begins with silver nitrate, gr. xxx (2.0) to the quart (1000 c.c.), followed by a normal saline irrigation, and the silver is gradually diminished until gr. v (0.3) are employed, or another irrigant—boric acid, ichthyol, balsam of Peru, argyrol 6 per cent. solution—is substituted.

When there is an abundance of pus or tissue *débris* peroxid of hydrogen—20 per cent.—is occasionally useful, and quinin bisulphate (1 : 1000) may be tried in entamebic colitis, but is not as reliable as other irrigants.

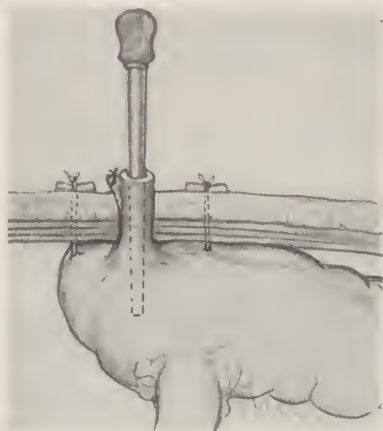


Fig. 1018.—Divulsing a narrow appendix with an appendical dilator.

The following combination is usually effective in cases of ulceration causing diarrhea and bloody stools:

R̄. Fl. ext. krameriaë..... ℥iv 120|0;
Bicarbonate of soda..... ℥ij 8|0.—M.

Sig.—A tablespoonful (15.0) to a quart (1000 c.c.) of warm water, and irrigate once or twice daily.

The accompanying emulsion is soothing and does much toward lessening peristalsis, eliminating inflammation and soreness, healing ulcers, and minimizing tenesmus when alternated with one of the above irrigating solutions:

R̄. Olive oil..... Oj 500|0;
Orthoform..... ℥j to ij 4|0–8.0;
Bismuth subnitrate..... ℥j 30|0.—M.
Ft. emulsion

Sig.—Warm, shake, and inject ℥ij to vj (60.0–180.0) at night.

Hot irrigants (100° to 110° F.) are soothing and preferable to *cold* (65° F.), which incite intestinal contractions that expel medication before it has accomplished its purpose.

The *amount* of medicated fluid employed in colonic irrigations is varied according to indications, but 2 quarts (2000 c.c.) allowed to run in slowly with the patient in the sitting, standing, or preferably recumbent posture, with hips elevated, is usually sufficient.



Fig. 1019.—Irrigating colon following the author's local anesthesia stab-wound appendicostomy.

A larger quantity, 2 to 4 quarts (2000–4000 c.c.), is employed to advantage in aggravated cases to cleanse colonic lesions of irritating discharges and *débris*, but when a large amount of solution is used a small proctoscope or perforated anal irrigator (Fig. 1020) is

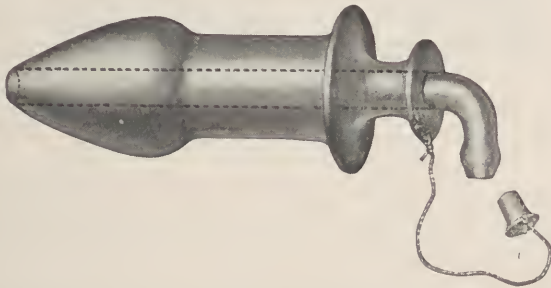


Fig. 1020.—Author's self-retaining ana irrigator employed independently or in connection with through-and-through colonic irrigation when the solution is introduced through an appendical (Fig. 1010) or cecal opening.

introduced through the anus to permit the solution to escape as it runs in, thereby preventing colonic distention and ptosis (Fig. 1021).

When *appendicostomy* and *cecostomy* and direct bowel treatment fail it is because of a serious complicating ailment, the bowel

is diseased above the colon, or the patient's *position* is not frequently *changed* during treatments so that the irrigant may reach lesions on all sides of the bowel.

With this method of handling chronic diarrhea the patient responds more quickly when the treatment is reinforced by dieting, internal medication, rest, and pleasant surroundings, therapeutic measures that usually fail in chronic ulcerative colitis causing diarrhea, except when employed in connection with through-and-through colonic irrigation.

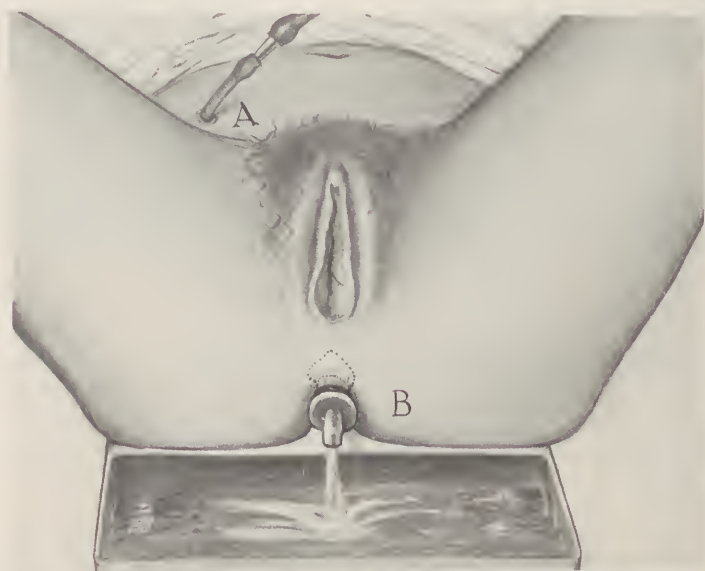


Fig. 1021.—Author's method of through-and-through colonic irrigation. The solution enters the appendical or cecal catheter or irrigator at *A* and passes out through the author's self-retaining anorectal irrigator *B*.

Changing the Intestinal Flora in Colonic Infections and Other Disturbances.—Introduction of the *Bacillus bulgaricus* group into the bowel with the object of changing the *intestinal flora* has become quite a fad, but the author's results from the procedure were unreliable, and he believes the enthusiasm shown by members of the profession for this method of treating colonic putrefaction and infection is unwarranted.

It is questionable whether or not the introduction of these organisms (however prepared) by way of the mouth, per anum, or by projecting them through an *appendicostomy* or *cecostomy* opening permanently benefits the patient by changing pre-existing flora, though a few of the author's patients apparently were temporarily

benefited by the treatment where the *Bacillus bulgaricus* was introduced into the infected colon by means of an oil media following *appendicostomy* and *cecostomy*. Attempting to change the intestinal flora in this manner appeals to the sufferer, and sometimes the author has felt that when good results followed the treatment they were due as much to the *psychologic* effect upon the patient as to the action of organisms introduced into the bowel.

Intestinal flora are more certainly and quickly modified by *diet*—changing from *meat* and *eggs* to an increased sugar diet—which, according to the dominance of one or the other, leads to an increase or diminution of indicanuria.

Hull and Rettger and other experimenters were unable to establish *Bacillus bulgaricus* by feeding these organisms to patients. Metchnikoff has reported good results from the treatment of colonic infections and putrefactions derived from lessening the number and diminishing the virulence of bacteria, but it is not unlikely that the relief or cure was due more to *decreasing proteins* and *increasing sugar* than to his prescribing *lactic acid bacilli* by mouth.

Chapter XCIV

Enterostomy—Ileostomy—Colostomy—Colotomy—Sigmoidostomy

Enterostomy.—This operation consists in anchoring the small gut to the skin and opening the bowel to relieve obstruction or cure other affections of the small intestine and colon.

The operation performed for such conditions is usually *ileostomy*, because the ileum is most often involved, though *jejunostomy* and *duodenostomy* have been resorted to in rare instances to provide drainage in high acute obstruction.



Fig. 1022.—Enterostomy—ileostomy—showing extruded gut and surrounding thickened raw skin induced by constant escape of irritating digestive juices and discharges, which makes this procedure more objectionable than colostomy, following which stools are non-irritating and solid.

Ileostomy is rarely performed except as a life-saving substitute when resection is for any reason contraindicated. Enterostomy is *objectionable* owing to location of the stoma, uncontrollable opening, frequent fluid evacuations, malnutrition and loss of weight through diminished colonic absorption, excoriation of or digestion of surrounding skin (Fig. 1022), and difficulty in closing the fistulous opening.

Usually *ileostomy* is a temporary makeshift to carry the patient over the dangerous stage of an acute illness—*obstruction*—while

colostomy is usually permanent and performed to relieve an incurable affection, as cancer, inoperable stricture, or extensive ulceration.

Indications for enterostomy are: (a) acute ileus from any cause when the patient's condition precludes enterectomy; (b) acute hemorrhagic colitis; (c) neoplastic and ulcerative tuberculosis of the ileocecal angle; (d) inoperable stricture or cancer of the small intestine, cecum, appendix, or ascending colon; (e) preliminary step to colonic resection; (f) multiple papillomata and adenomata with ulceration of the colon that does not respond to *appendicostomy* or *cecostomy* and *irrigation*; (g) to relieve complications incident to previous operations; (h) provide a means of feeding patients suffering from gastric or duodenal ulcer or obstruction, and (i) provide for flushing the small intestine in cases of infectious disease or ptomain poisoning.

Technic.—Preparation of the patient is the same as for colectomy, and the operation is performed under *general* or *local anesthesia*—eucain $\frac{1}{8}$ per cent. infiltration—the latter being preferable in very *urgent* cases, where the operation is performed without the patient leaving his bed.

Owing to length of the small intestine the abdomen may be opened in the median line or through the left or right rectus muscle. When obstruction is acute haste is imperative and the first distended loop of small intestine coming into view is brought to the surface and snugly sutured to the skin and structures of the abdominal wall. In such cases and when ileostomy is a *preliminary* step to enterectomy or colectomy attempts to locate the obstruction are avoided because unnecessary handling of the intestine is often responsible for shock and paralytic ileus.

Unless the patient is critically ill from obstruction, toxemia, or distention the gut is not *opened* for two or three days until adherent to surrounding structures, which diminishes danger of infection, but in urgent cases the bowel is immediately surrounded with gauze, opened with a cautery, drained and irrigated with warm normal saline solution, following which a previously introduced purse-string suture is tied about a long rubber tube placed in the proximal bowel, which later carries the intestinal contents to a receptacle beneath the bed.

The fistula thus formed is closed when the obstructing lesion is resected or later.

In cases of acute obstruction no attempt is made to guard against involuntary evacuations, but when ileostomy is performed for *chronic* hemorrhagic colitis, inoperable obstruction, inflammatory and ulcerative lesions, or polyposis of the ileum or colon, the author

endeavors to make a partially controllable anus by twisting the bowel upon its axis before suturing it to the skin, snugly suturing the split rectus about the intestinal loop, or carrying the bowel beneath and bringing it out through the skin 2 or 3 inches (5.08–7.62 cm.) to the right or left of the original incision, following which it is anchored by a few interrupted catgut sutures, and the original incision is closed. In this class of cases there is no occasion for opening the gut before the third day unless the patient suffers severely from gas-pains, when it is immediately punctured.

The methods of closing fecal fistulæ and artificial ani, which are similar in many respects, have been discussed in the following chapter.



Fig. 1023.—Carcinoma grafted on gut extruded through an artificial anus established for the relief of multiple tubercular strictures of the colon complicated by multiple fecal fistulæ.

Cecostomy in the form of an artificial anus is occasionally resorted to in the palliative treatment of inoperable cancer, but is rarely performed in the curative treatment of colonic, inflammatory, and obstructive lesions, owing to annoyance caused by the involuntary escape of fluid feces, but *cecostomy*, wherein a *catheter* is inserted (see Chapter XCIII) to provide for through-and-through medicated colonic irrigation in cases of catarrhal and specific ulcerative colitis, is a common and useful procedure. Steps in the formation of a cecal anus are the same as for colostomy described below.

Colostomy—Colotomy—and Sigmoidostomy.—Since the sigmoid is a colonic segment and the technic of establishing an artificial anus in other parts of the colon and the sigmoid flexure is the same, the procedure will hereafter be designated *colostomy*.

The author restricts the term *colotomy* to operations where the colon is opened for the extraction of a foreign body or other purpose and immediately closed; and *colostomy*, where a temporary or permanent *artificial anus* is established.

Colostomy consists in making a *vent* in a colonic segment sutured in the skin to relieve obstruction, heal inflammatory and ulcerative lesions, or cure polyposis by putting the bowel at rest, and providing a means of directly treating diseased areas with radium, cauterization, irrigation, and topical applications.

Formerly the author frequently resorted to colostomy in the treatment of chronic diarrhea caused by *catarrhal*, *amebic*, *bacillary*, *balantidic*, *tubercular*, *luetie*, *gonorrheal*, and *helminthic* colitis, but on account of the disgusting features connected with an artificial anus and effectiveness of *appendicostomy* or *cecostomy* and *through-and-through* medicated irrigations he has almost abandoned the former in favor of the latter in these cases.

The *indications* for temporary or permanent colostomy are numerous, and the author has performed the operation to relieve or cure the following conditions:

1. Congenital deformities where the rectum terminated in a blind pouch so high that it could not be freed and sutured to the perianal skin.
2. Anorectal congenital anomalies complicated by rectovesical, rectovaginal, and recto-urethral fistula.
3. Congenital deformities of the colon or sigmoid flexure causing partial or complete obstruction.
4. Hirschsprung's disease—megacolon.
5. Malignant neoplasms located in the colon, sigmoid flexure, or rectum, unsuitable for resection or proctectomy.
6. Inoperable strictures of the large intestine or rectum.
7. Rectocolonic polyposis—multiple adenomata.
8. Neglected catarrhal, specific, and membranous coloproctitis that fails to respond to appendicostomy or cecostomy and through-and-through irrigation.
9. Congenital and acquired rectovesical and recto-urethral fistulæ.
10. Rectocolonic obstruction from inoperable extra-intestinal pressure caused by adhesions, Jackson's membranes, and abdominal tumors.
11. Extensive injuries to the colon and rectum.
12. Sloughing of entire rectal mucosa the result of a hot-water enema.
13. Destruction of the rectum and perianal structures—with

rectovesical fistula—induced by the carbolic injection treatment of hemorrhoids.

14. Extensive incurable procidentia recti complicated by extensive ulceration and hemorrhages.

15. Necrosis following invagination and strangulation of the sigmoid into the rectum.

16. Relieve patient afflicted with chronic diarrhea and fecal incontinence.

17. Multiple strictures of the colon.

18. Acute hemorrhagic colitis.



Fig. 1024.—Front and side views of moderate degree of prolapse of the sigmoid flexure and hernia that resulted from an improperly made artificial anus established to relieve rectal cancer.

19. As a preliminary step toward the cure of a fistula connecting the large and small intestine.

20. Inoperable diverticulitis with peridiverticulitis complicated by sigmoidovesical fistula.

21. Pelvic abscess discharging through the rectum.

22. Paralytic ileus.

23. To relieve chronic constipation, fecal obstruction, and auto-intoxication in a decrepit old man.

24. For obstruction in the sigmoid flexure caused by an encysted foreign body in a woman suffering from Bright's disease.

25. Preliminary steps to rectal extirpation.

26. For diverticulitis of the sigmoid flexure.

The author has performed colostomy on patients varying in age from a *day-old* infant suffering from congenital rectal occlusion to a man *eighty-eight* years of age afflicted with cancerous obstruction of the rectum.

Colostomy frequently is not a curative procedure, but following operation patients may live from a few days to the full span of life, depending on the conditions for which the artificial anus was established and complicating disease.

Five of the author's patients colostomized respectively twenty-five, twenty-three, twenty-two, and nineteen years ago are still living, but in each instance the operation was performed to relieve obstruction from non-malignant disease.

Sufferers colostomized for rectocolonic cancer (Fig. 1024) seldom survive more than a year and the majority die within seven months, yet many would have lived a comfortable existence for a much longer time had an artificial anus been established earlier before obstruction or exhaustion ensued.

From January, 1900 to January, 1918 the author performed colostomy for cancer of the colon, sigmoid flexure, rectum, or anus 311 times, and the duration of life following operation is shown in the accompanying table:

DURATION OF LIFE FOLLOWING COLOSTOMY FOR CANCER—AUTHOR'S SERIES

	Months.
1 lived.....	47
1 lived.....	36
2 lived.....	30
9 lived.....	18 to 20
15 lived.....	15 to 18
19 lived.....	12 to 15
29 lived.....	10 to 12
47 lived.....	8 to 10
56 lived.....	6 to 8
65 lived.....	4 to 6
67 lived.....	1 to 4

311

Average duration of life six to seven months.

In addition to above the author has many times performed colostomy to relieve or cure non-malignant affections, and as a preliminary step to rectocolonic resection or excision.

The *mortality* for colostomy is almost *nil* when the operation is performed for benign disease and incipient cancer, but death occasionally ensues when the patient is extremely old or debilitated, has acute obstruction or suffers from arteriosclerosis, severe heart lesion, chronic bronchitis, diabetes, Bright's disease, or enlarged

prostate with cystitis. The author's colostomy mortality has been 2 per cent.

The most frequent causes of death from colostomy are pneumonia, nephritis, peritonitis—from partial or complete retraction of the gut end or perforation from an ulcer—shock, suppression or retention of urine, or an acute exacerbation of other pre-existing chronic diseases.

Some surgeons defer forming an artificial anus in cancer cases until marked obstruction or agonizing pressure pains are obvious, which is a mistake, since colostomy is indicated for practically all *inoperable* rectocolonic cancers, because afterward the patient has better control over the movements, suffers less, lives longer, and is given the benefit of a possible cure with *radium* or *x-rays* when the bowel is put at rest and kept clean by medicated irrigations.

Briefly summarized, benefits derived from colostomy reinforced by electricity, local treatment, and irrigation for malignant and other chronic disease of the colon and rectum are: (*a*) as a preliminary step it shortens the operation and lessens the mortality of colectomy and proctectomy; (*b*) prevents or relieves obstruction in inoperable cancer and stricture cases; (*c*) diminishes pain; (*d*) minimizes discharge; (*e*) modifies the odor; (*f*) reduces bearing-down pain and tenesmus; (*g*) overcomes diarrhea; (*h*) decreases hemorrhage; (*i*) obviates fecal impaction; (*j*) attenuates perirectal inflammation; (*k*) curtails danger of infection, abscess, and fistula; (*l*) favors healing of ulcers above and below the occlusion; (*m*) retards growths; (*n*) causes partial or complete disappearance of cachexia; (*o*) encourages the patient; (*p*) in rare instances helps to mobilize the gut for later excision by reducing inflammatory exudates and size of the neoplasm; (*q*) prepares a clean operative field when the growth or lesion is to be removed; (*r*) improves digestion; (*s*) relieves gas distention, pain, and (*t*) is followed by gaining weight.

Following *permanent* colostomy for inoperable cancer, stricture, diverticulum, congenital malformation, and other conditions and establishment of a *temporary* artificial anus for inflammatory or ulcerative lesions and multiple papillomata or adenomata, suffering is immediately modified or completely relieved, the patient rapidly gains in weight and shows a marked improvement, benefits attributable to medicated irrigations, putting the bowel at rest, preventing feces reaching the diseased area, and better assimilation of food.

Since the operation requires but a few moments, is usually performed under local anesthesia, rarely causes death, always diminishes suffering, is occasionally curative, and prolongs life

in cancer cases one should not hesitate to perform colostomy when indicated, especially since with modern technic an artificial anus, over which the patient has partial or complete *control*, can be easily established (Fig. 1031).

Owing to disagreeable features colostomy is not practical except in cases that cannot be relieved or cured by a less objectionable procedure and as a preliminary step to intestinal extirpation.

The author makes a practice of explaining the nature of the operation before establishing an artificial anus, and lets the patient decide whether or not he will undergo it after the benefits and disadvantages of colostomy have been pointed out.

Patients object to an artificial anus because (a) of the unnatural location of the opening, (b) absence of warning for approaching stool, (c) involuntary escape of gas and feces—particularly during diarrheal attacks, (d) escape of mucus, (e) soiling of clothing, and (f) necessity of wearing a bandage or apparatus to retain (Fig. 1047) or catch feces in case of accident (Fig. 1046).

If family physicians and patients understood how little annoyance an artificial anus *rightly constructed* causes and the benefits therefrom they would object less strenuously to this beneficent procedure.

In a few instances where patients exhibited a marked aversion to an opening in the side the objection was removed by substituting colonic *exclusion* (Fig. 1067) or the author's *vaginal* (Figs. 1054, 1056) for inguinal or central colostomy.

However made, the patient has little if any control over evacuations at first because *raw ends of the gut like ulcers in colitis incite hyperperistalsis* and feces are evacuated fluid, since they have no opportunity to become solidified; however within a month after operation—when wound is healed—70 per cent. of the author's colostomized patients have but one movement daily—often following a laxative—except they have diarrhea from digestive disturbances. Instead of waiting for a movement his colostomized patients are taught to procure an evacuation when they desire by injecting a few ounces of warm water into the proximal opening, and as a result the bowel soon forms a habit of evacuating at a certain time.

There is little difficulty in *closing an artificial anus* (see following chapter) in the manner hereafter described (Figs. 1079, 1081) when the object for which colostomy was performed has been attained.

Some surgeons claim *disuse* of the bowel for a considerable time impairs its *function*, but the author holds an opposite view, since in 10 instances he has re-established continuity after the

fecal current had been shut off from colon, sigmoid flexure, or rectum from one to five years, and in each case the patient subsequently had regular evacuations and the bowel acted normal in other respects.

Depending on the object to be accomplished colostomy may be *preliminary*, *temporary*, or *permanent*.

Preliminary Colostomy.—An artificial anus is occasionally formed as a preliminary step (Fig. 1025) to provide drainage and empty the gut of retained feces in cases of obstruction and when the bowel is to be excluded, resected, or amputated for cancer, polyposis, and inflammatory lesions to give the patient an opportunity to recuperate, shorten the operation, procure a clean operative field, and minimize danger from postoperative sepsis.

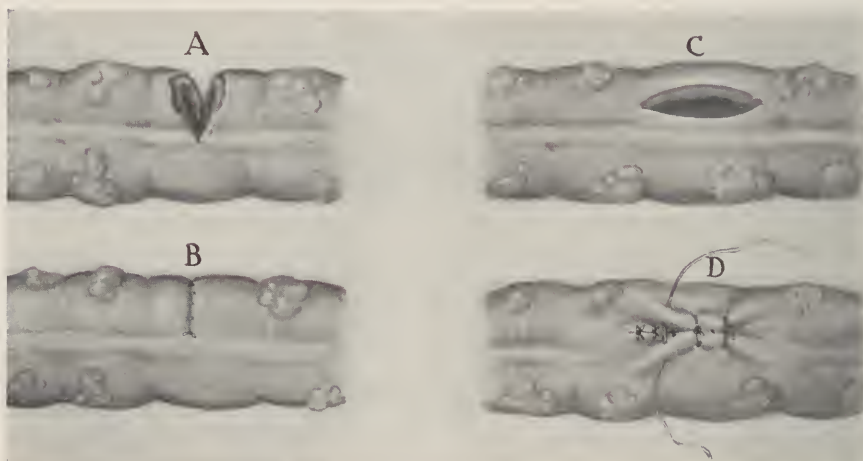


Fig. 1025.—Preliminary and temporary colostomy when the stoma is to be closed in a short time: *A* and *B* show the manner of opening and closing the gut when incised transversely; *C* and *D*, the bowel opened and closed longitudinally.

Preliminary colostomy may be performed days or weeks before, or in urgent cases may immediately precede colectomy or proctectomy, and the technic under such circumstances has been discussed with these procedures.

Temporary Colostomy.—When an artificial anus is established with the idea of its closure within a few days, weeks, or months, or after inflammatory and ulcerative lesions, polyposis or other disease has been cured by putting the bowel at rest, irrigation, topical applications or other therapeutic measures, the procedure is designated *temporary colostomy* (Figs. 1025, 1074, 1077).

The author has resorted to the operation many times to heal

or cure otherwise uncontrollable *ulcerative, luetic, entamebic, tubercular, bacillary, balantidic, and catarrhal coloproctitis* complicated by *mixed infection*; extensive wounds caused by operation, burning the mucosa with turpentine, injuries and sloughing from carbolic acid injection of hemorrhoids, multiple polyps, membranous enterocolitis—colica mucosa—and relieve obstruction prior to radical operation.

The **technic** of *temporary* differs slightly from that of *permanent colostomy*, for making of a *spur* requires less attention and the open-

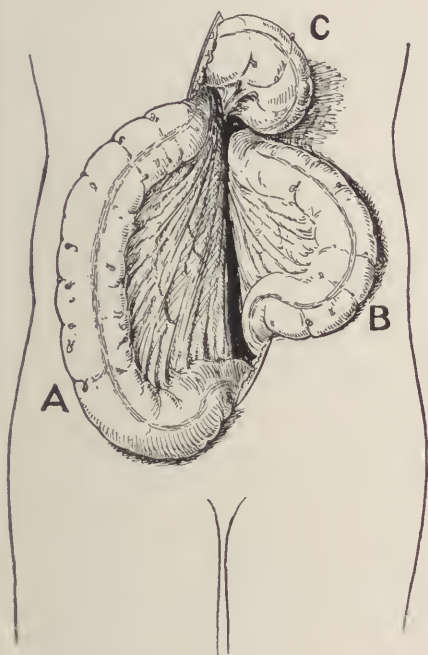


Fig. 1026.—Showing variations in length of colonic mesentery: *A*, Very long; *B*, medium; *C*, very short. Encountered in different individuals when performing colostomy.

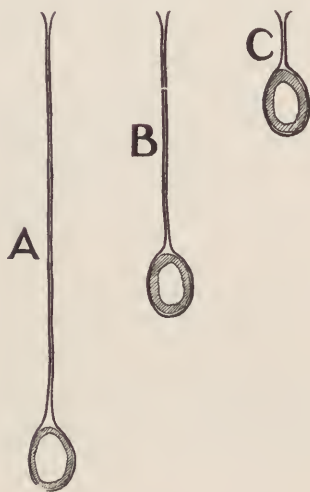


Fig. 1027.—Colonic mesentery when withdrawn from the abdomen. It is shown long in *A*, medium in *B*, and short in *C*.

ing may be made above in close proximity to lesions that they may be easily treated. When establishing a temporary anus removal of a lengthy segment of gut to prevent procidentia coli is not required, and leaving sufficient colon or sigmoid below the opening for resection as done in cancer cases is unnecessary.

If made to provide drainage and relieve obstruction preceding colectomy or proctectomy suturing a loop of gut in the skin is not essential, for the object sought is attained with less annoyance

to the patient by tying a purse-string suture about a long drainage-tube introduced through a stab wound, following which the bowel is attached to the parietal peritoneum and the abdominal wound closed.

In a few instances where the *stoma* was to be left but a short time steps in the operation were about the same as for permanent colostomy except the bowel was split *longitudinally* or transversely (Figs. 1025, *C*) instead of being amputated at the skin, and subsequently the intestine was detached from the abdominal wall and the opening eliminated by closing and then infolding the opening through coloplication (Fig. 1075).

Better results are obtained when an artificial anus is to be left a few weeks or months by making and closing the anus after the plans hereafter recommended.

Permanent Colostomy.—A permanent artificial anus may be established to relieve previously named conditions, but usually is performed as a *surgical palliative* measure to relieve obstruction

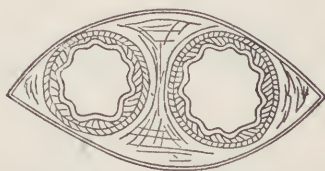


Fig. 1028—Appearance of doubled-barreled opening in properly constructed artificial anus—colostomy.

incident to inoperable cancer, incurable stricture, chronic diarrhea accompanied by pain, hemorrhage, and exhaustion caused by extensive rectocolonic ulceration or multiple adenomata that do not respond to conservative treatment or less objectionable operation.

Permanent colostomy is frequently resorted to as a preliminary step to or during colectomy, sigmoidectomy, and proctectomy. Occasionally putting the bowel at rest with irrigation and local treatment relieves or cures the disease, in which case the anus is closed.

When colostomy is expected to be permanent particular care is exercised to make the anus *controllable*, and the patient is advised not to worry concerning the abnormal location of the anus and to train the bowel to act at a regular time—by enemas—and carry on his business as usual.

Colostomy is a failure unless *all feces* are prevented from reaching and irritating the diseased area, which is accomplished

by bringing out, anchoring, and amputating not less than 2 inches (5.08 cm.) of gut, forming the *double-barrel shotgun* effect shown in the accompanying illustration (Fig. 1030).

Many surgeons make a *fecal fistula* (Fig. 1029) believing they are establishing an artificial anus (Fig. 1028) by suturing the upper surface of the bowel to the skin and opening it (Fig. 1029), an operation possessing the disadvantages but not the benefits of colostomy, since feces discharge through the abdominal opening and reach the diseased area by passing along the mesenteric surface of the gut.

Preparation is the same as for other laparotomies except when obstruction is marked and the intestine is to be opened at operation, in which case after the gut has been emptied and cleansed by

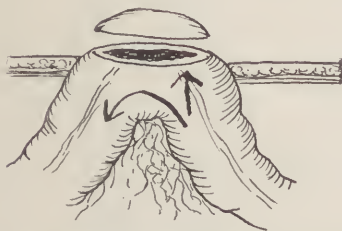


Fig. 1029.—Wrong method of suturing and opening gut in colostomy. Afterward feces escape both through stoma and diseased rectum.

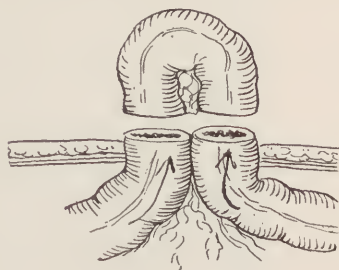


Fig. 1030.—Right way of suturing and opening gut which is withdrawn until mesentery shows above the skin, then when amputated a double-barreled opening is produced through which all feces escape, thereby protecting the diseased rectum.

laxatives and high irrigation, preoperative opiates are prescribed to arrest peristalsis.

The author has several times colostomized patients under *local* anesthesia, but *general* anesthesia is preferable in the presence of complications.

The **technic** of forming an artificial anus varies, depending on location of the disease, condition of the patient, preference of the operator, and whether or not an attempt is to be made to give the patient control over stools.

Formerly *left* and *right lumbar* colostomy were frequently performed because the colon was reached posteriorly without entering the peritoneal cavity, but as technic in aseptic work advanced lumbar colostomy has become *obsolete*, since the operation requires considerable time, deep muscular dissection, the colon

is brought to the surface with difficulty, formation of a spur is impossible, retraction is common, involuntary evacuations are usual, and the anus is inconveniently located where the patient cannot properly take care of it.

The artificial opening must be made in healthy gut *above the disease*, which may necessitate formation of the anus on the *right* or *left* side or *central* abdomen, but when the operator has the choice the lowest colonic segment feasible is selected, because feces are more solid than higher up and involuntarily escape less often than when an outlet is made in the cecum or ascending colon.



Fig. 1031.—Steps in author's local or general anesthesia controllable colostomy, showing relation of gut to fascia, fat, and skin.

In 90 per cent. of cases the sigmoid flexure is opened and is approached through the inguinal region, left rectus muscle, or median line, hence the anus is established in either region according to indications.

With abandonment of lumbar, inguinal—iliac—colostomy became popular, but recently placing the opening at or near the *central* abdomen has gained in favor because the sigmoid is conveniently reached and dressings or apparatus worn for catching and retaining feces are more satisfactorily adjusted and kept in place here than nearer the iliac crest.

Through a median or rectus incision all colonic segments are reached with ease.

Inguinal—Iliac—Colostomy—Sigmoidostomy.—The author has performed this operation 350 times, with satisfactory results, except in a few early cases operated before his present technic had been fully developed.

Author's Technic.—With the patient in the recumbent posture the abdomen is opened in the left inguinal—iliac—region by a 2-



Fig. 1032.—Steps in author's local or general anesthesia controllable colostomy, showing method of placing anchoring stitches and suturing bowel and skin to prevent herniation of small intestine.

inch (5.08 cm.) blunt intermuscular dissection incision intersecting a line extending between the umbilicus and the anterior spinous process at the inner border of the external and internal oblique muscles, using the index and middle fingers working outward, the internal oblique is separated from the transverse muscle for $1\frac{1}{2}$ inches (3.81 cm.), the fingers are then carried upward, penetrating both oblique muscles, and finally pass over the external oblique inward to the original incision, making a *channel* between sub-

cutaneous fat and muscle. A loop of sigmoid or descending colon is now located, examined, lifted upward, and drawn along the route traversed by fingers and through the original abdominal incision (Fig. 1031), where it is brought out and sutured to the skin (Fig. 1032).

The operation is completed by approximating muscles and fascia snugly about the bowel with interrupted chronic catgut

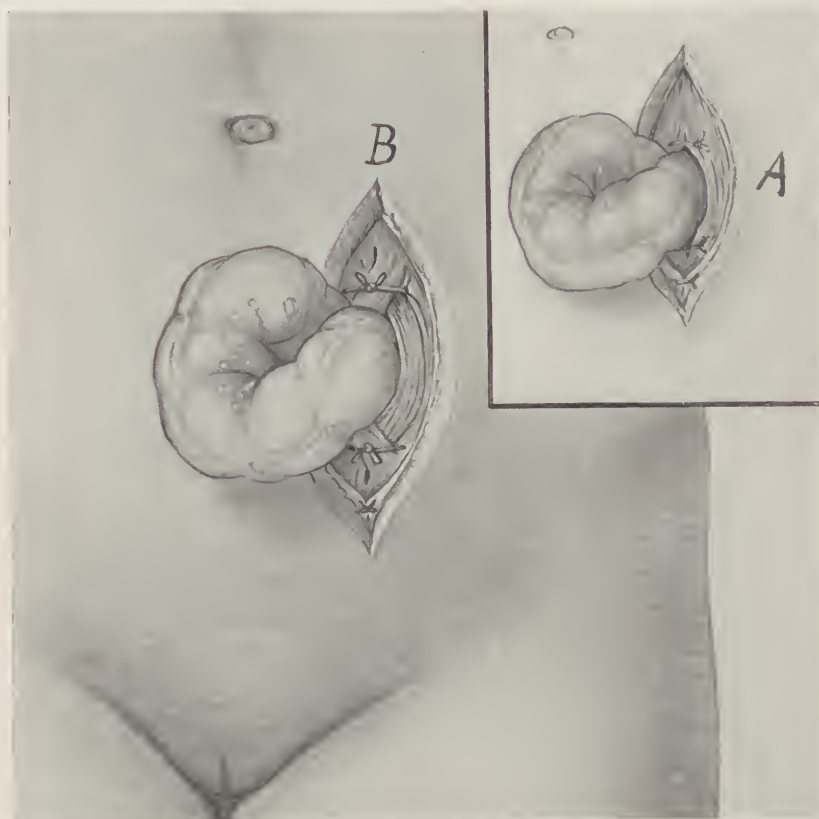


Fig. 1033.—Method of establishing a controllable artificial anus (A) by suturing split rectus snugly about the twisted gut, and (B) arranging fibers of the muscle in figure-of-8 fashion around the bowel.

sutures and introducing linen or silkworm-gut *angle* stitches that pass through the skin, musculature of the bowel, and integument of the opposite side, which when tied (Fig. 1032) close ends of the incision, and prevent retraction of the gut. In this procedure *peritoneum* is *ignored*, and suturing the sigmoid all round to prevent hernia of the small intestine is unnecessary since there is no opportunity for the gut to escape from the abdomen.

To preclude feces reaching the diseased rectum the bowel is brought well above (Fig. 1030) and not sutured on a level with the skin (Fig. 1029) as practised by some surgeons.

Left Rectus—Central—Colostomy.—The gut is approached through a 2-inch (5.08 cm.) incision made over and through the middle of left rectus, which is split with fingers, handle of scalpel, or blunt scissors at a point midway between umbilicus and pubes (Fig. 1033). The sigmoid is hooked and drawn upward through opening in the muscle, brought to the outside, following which the posterior sheath, split rectus, and anterior sheath are snugly sutured about the bowel, or muscle is attached to it in figure-of-8 fashion



Fig. 1034.—Final steps in author's colostomy where both ends of bowel are drained with his double hard-rubber drainage-tube to which is attached his fecal reservoir employed in emergency operations.

(Fig. 1033, *B*) with interrupted chromic or iodine catgut stitches (Fig. 1033, *A*); then after linen or catgut angle sutures have been introduced, and the sigmoid has been attached to the skin to prevent escape of the small intestine, the bowel is covered with rubber tissue smeared with vaselin.

Only a few of the author's patients have been annoyed by *involuntary evacuations* after the third week—or healing of wound—owing to action of the trained rectus, but where the sufferer insists on all precautions being taken to procure a *controllable* anus the bowel is carried through a subcutaneous *tunnel* (Bailey), brought out through a second cut made 2 inches (5.08 cm.) to the left of the original incision, and anchored (Fig. 1043).

Correct application of dressings about and over the gut avoids unnecessary postoperative suffering. After the intestine has been covered with *gutta-percha* tissue or sheet rubber smeared with *vaselin* to prevent gauze from becoming adhered to it a *bird-nest-like* dressing is applied about the exposed bowel to protect it from pressure caused by overlying dressings retained in place by adhesive strips placed on either side to prevent pressure on the gut.

The bowel is not opened for several days unless obstruction is acute, when the gut is immediately punctured or opened and ligated about a long drainage-tube to relieve distention pain, a procedure which does not endanger life, but increases possible infection of the suture line.



Fig. 1035.—Author's method of retaining feces in the sigmoid until solidified and reducing annoyance from incontinence by doubly angulating the bowel proximal to the colostomy opening with suspension sutures tied across rubber tubing.

Comments.—English surgeons emphasize the importance of making a *spur*, and have devised several ways of accomplishing the purpose, all of which are superfluous in the author's technic, where a medium-sized abdominal opening is made and the sigmoidal loop is drawn upward until its mesenteric border is at or *above the skin level*, which prevents retraction of the gut and insures agglutination of the legs of the loop through contraction of the muscular ring surrounding them.

Occasionally the author has formed a *reservoir* to hold feces until solidified by forming a sigmoidal *swing* through anchoring the descending colon to the abdominal wall—colopexy—several inches above the artificial anus (Fig. 1035), but this procedure has no great advantages over a controllable anus.

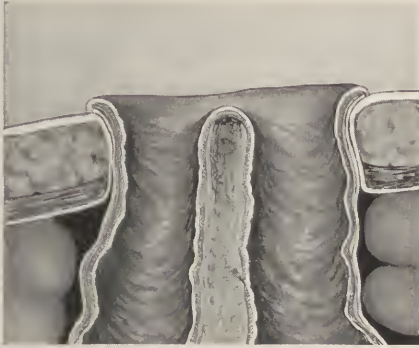


Fig. 1036.—Gut split to show its appearance in colostomy when sufficient bowel has been amputated to prevent procidentia.

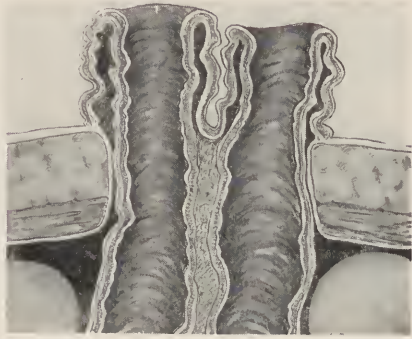


Fig. 1037.—Gut split to show its appearance when slack has not been removed and procidentia ensues.

To avoid postoperative rectal and sigmoidal *procidentia* (Figs. 1037, 1038) the sigmoid is drawn well out of the pelvis and the descending colon downward until *taut* before the gut is sutured to



Fig. 1038.—Extensive prolapse of proximal and distal ends of the bowel through a colostomy opening; in this case the extruded gut became strangulated and assumed enormous proportions.

the skin, and the experience of many operations has proved that removal of a few additional inches of colon does not increase mortality of the operation (Figs. 1033, 1035).

When an artificial anus is established before or during colectomy the sigmoid is doubly clamped and divided with cautery, and the *proximal* sutured to the integument and the *distal* end of gut closed and dropped into the abdomen or attached to the skin.

An artificial anus should be about 1 inch (2.54 cm.) in *diameter*, since when the opening is *smaller* or strictured (Fig. 1041) involuntary evacuations are frequent, and when *larger* (Fig. 1039) solid feces, mucus, and gas involuntarily escape without warning.

Suturing *peritoneum* to the skin before anchoring the bowel is unnecessary and the procedure interferes with muscular contraction about the gut, favors hernia of the small intestine, and is responsible



Fig. 1039.—Improperly constructed artificial anus, the opening being made so large by the surgeon that the patient had no control over gas or feces.



Fig. 1040.—Sigmoid flexure suspended on a glass rod to prevent retraction when tension is marked or sigmoid mesocolon is short.

for the destruction of the spur, permitting feces to reach the rectum when the peritoneum stretches, and retraction following amputation of the sigmoid is more frequent than when the bowel is attached directly to fascia and muscles.

When *fascia* and *integument* are too tightly sutured about the gut it causes increased *gas* formation, obstructive manifestations, and occasional sloughing of the bowel.

In the author's operation supporting the intestine with a glass rod (Fig. 1040) is unnecessary unless tension is marked, when the rod is made to penetrate the mesentery between vessels to avoid hemorrhage, or a supporting side-to-side suture is introduced.

Meteorism, distention, pain, and sloughing are diminished or prevented by avoiding *tension* on mesentery through *mobilization* of the sigmoid by dividing adhesions and straightening out kinks.

Lengthy appendices epiploicæ and mesocolonic fat projections are ligated and removed, since they delay or prevent union between the sigmoid and abdominal wall and provide an outlet for the small intestine.

An artificial anus is never established in gut near a *cancer*, otherwise the opening later becomes involved in the malignant process (Fig. 1023). Danger from *retraction* and consequent infection and peritonitis is decreased by amputating the sigmoid just above the skin, which is not objectionable since the projecting rim disappears with healing of the wound.

That the gut may become adherent to surrounding structures which prevents subsequent complications the bowel is not *amputated for several days* unless there is acute obstruction, when a purse-string suture is tied about a long rubber drainage-tube intro-



Fig. 1041.—Strictured artificial anus through which feces constantly dribbled.

duced through a stab wound at any time obstructive manifestations become acute (Fig. 1048).

The intestine is removed in five minutes under local or general anesthesia—patient remaining in bed—by two or three bold cuts made with scissors, following which spurting vessels and tissues are caught and ligated *en masse* with a few strong linen ligatures and oozing is controlled by hot-water compresses. To avoid excising the gut later the author's colostomy clamp (Fig. 1042) may be applied at finish of the operation; the instrument subsequently amputates the bowel by pressure necrosis.

Fecal incontinence is prevented or modified by (a) the author's plan above outlined (Fig. 1031); (b) taking measures to insure approximation of the intestinal legs; (c) making an appropriate sized opening; (d) establishing a fecal reservoir in the sigmoid—

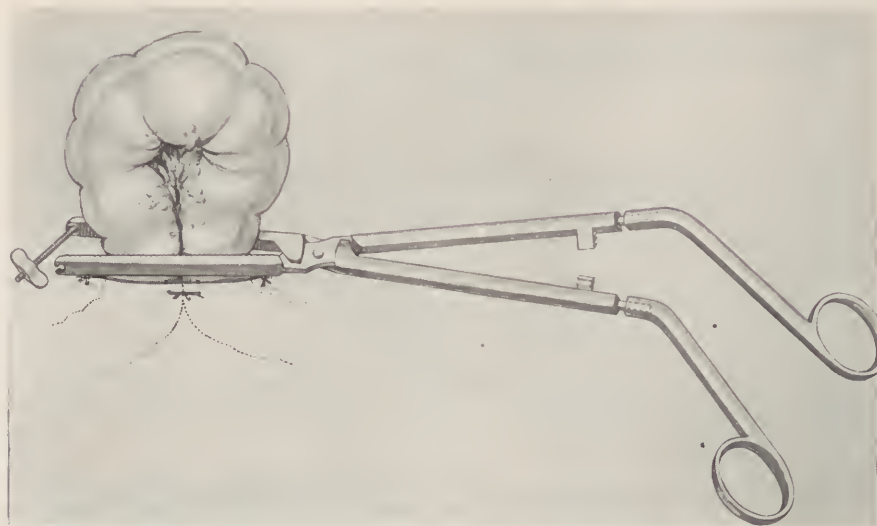


Fig. 1042.—Author's colostomy clamp having detachable handles which when left *in situ* amputates the bowel in three or four days. The instrument seldom causes discomfort.

Wyeth (Fig. 1035); (e) twisting the bowel before anchoring it—Gersuny (Fig. 1044); (f) making a subcutaneous tunnel (Fig. 1043),

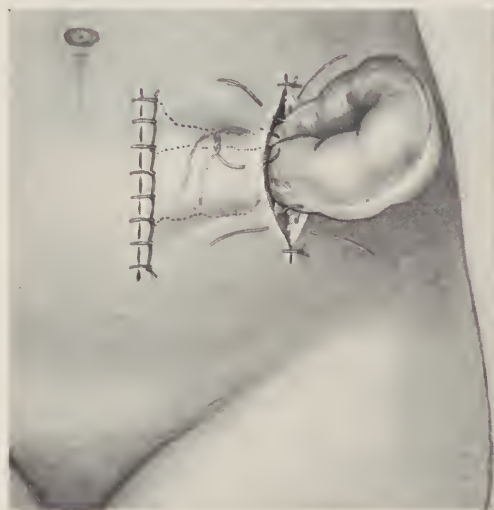


Fig. 1043.—Plan of making a controllable artificial anus by tunnelling beneath the skin and bringing the gut out through a second incision.

and suturing the gut in a second made some distance from the original incision (Fig. 1043)—Bailey, Witzel, Tuttle, Gant; (g)

carrying gut between the anterior and posterior fibers of the rectus abdominis from right to left (Witzel), or left to right (von Hachur), or vertically through the muscle, which is snugly sutured about it (Ryal, Gant; Fig. 1032, *A, B*); (*h*) and educating the bowel to act at a regular time by small warm water injections (Gant).

When a *non-controllable* anus has been made, annoyance from *involuntary evacuations* and *escape of mucus* is prevented or mitigated by introducing the author's *rubber inflatable dumbbell-like apparatus* (Figs. 1045, 1047), which when properly distended and adjusted completely prevents escape of feces, mucus, and gas,

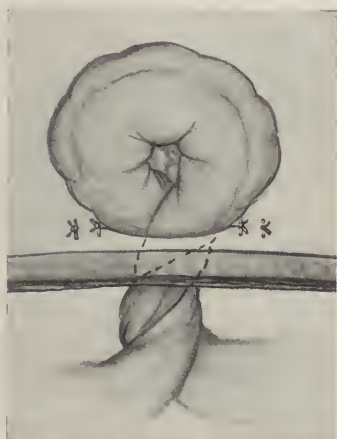


Fig. 1044.—Sigmoid twisted before attachment in wound to diminish subsequent fecal leakage.

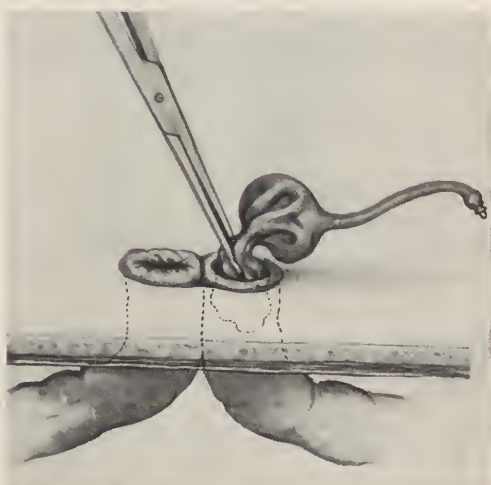


Fig. 1045.—Author's soft-rubber self-retaining dumbbell-shaped soft-rubber bag being introduced.

which is preferable to Delateour's apparatus (Fig. 1046), since it is more comfortable and effective.

Postoperative Treatment.—The after-care of colostomized patients is simple, and, briefly stated, consists in (*a*) temporary administration of morphin, gr. $\frac{1}{4}$ (0.016), and atropin, gr. $\frac{1}{150}$ (0.000432), three times daily, to relieve muscular rigidity and lessen pain from gas accumulation; (*b*) prescribing fluid nourishment; (*c*) opening the gut at any time when distention cramps or hiccups become troublesome; (*d*) cleansing the bowel of irritating discharges with hot boric acid irrigations; (*e*) amputating the gut anywhere from three to six days after operation; (*f*) procuring the first evacuation with castor oil, ʒss (15.0); (*g*) treating raw wound edges with silver nitrate 6 or ichthyol 20 per cent.; (*h*) preventing excoriation



Fig. 1046.—Colostomy: Cumbersome rubber bag and straps usually employed to catch feces. This apparatus is inconvenient, becomes fouled, and fluid feces dribble out between it and the skin.

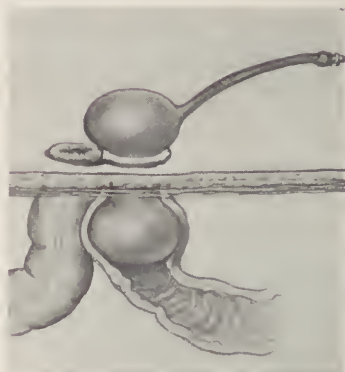


Fig. 1047.—Author's dumbbell-shaped soft-rubber bag which when inflated effectively prevents involuntary escape of gas and feces. It induces little discomfort because of its small size and no strap or other inconvenient apparatus is required.

of surrounding skin with zinc oxid; (i) administering bismuth, gr. x (0.6), in conjunction with a full course diet to solidify and minimize

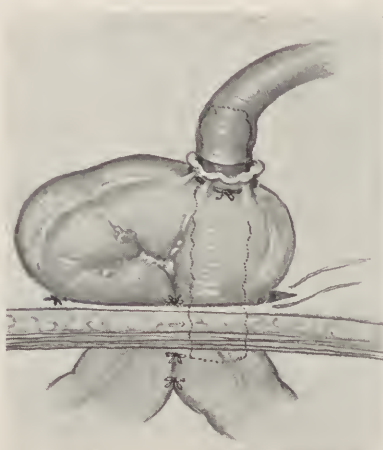


Fig. 1048.—Proximal end of bowel drained by ligating the gut around the author's hard-rubber corrugated drainage-tube. Employed in cases of acute colonic obstruction.

the number of evacuations; and (j) having the patient wear a special binder or apparatus (Fig. 1047) until he has obtained control over the

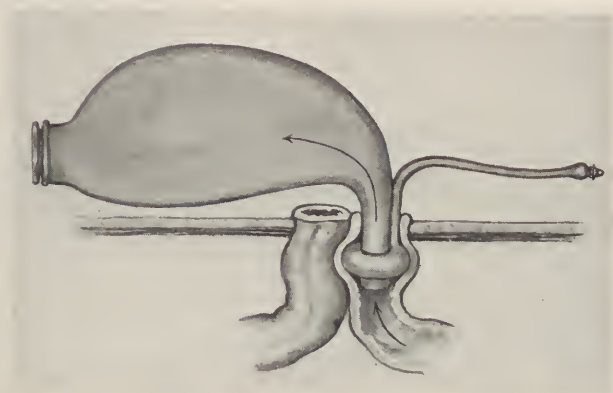


Fig. 1049.—Showing the author's soft-rubber fecal reservoir in position following inflation of the surrounding rubber ring which prevents escape of gas and feces. Employed subsequent to *emergency* colostomy operations.

anus and educated the bowel to move daily at the same time by injecting a few ounces of oil or water into the sigmoid.



Fig. 1050.—Ulceration and stricture of an artificial anus resulting from early retraction of the gut.

Sufferers following colostomy are permitted to get out of bed in one or allowed to leave the hospital in two, and given permission to do what they please or go to work in from three to four weeks.

Ulcers (Fig. 1050) surrounding an artificial anus are healed by

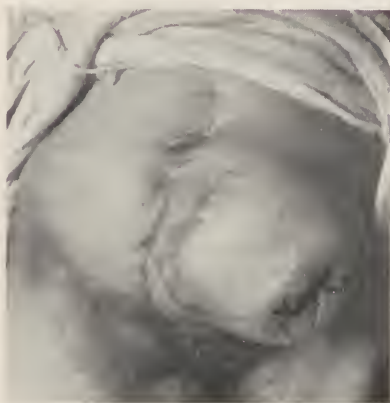


Fig. 1051.—Enormous ventral hernia that followed constant straining due to a surgeon's imperfect technic in making the colostomy opening too small.

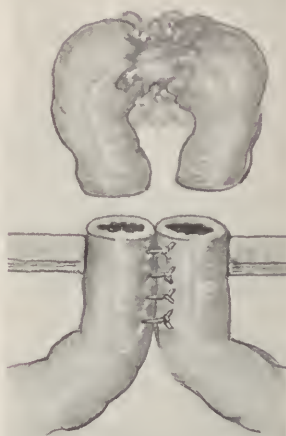


Fig. 1052.—Method of bringing cancerous gut outside and removing it following suturing of bowel in the wound—*two-stage* excision operation, see p. 353. Later the stoma is closed under local anesthesia as shown in Figs. 1078, 1079—*three-stage* operation.

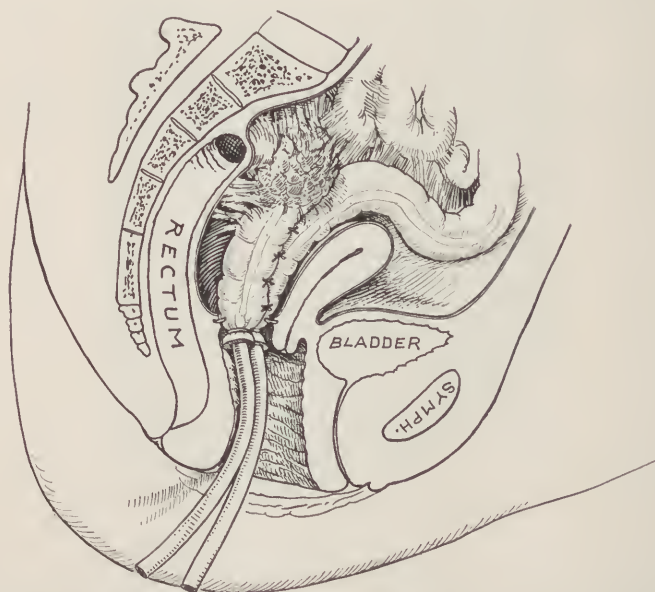


Fig. 1053.—Author's vaginal colostomy performed for inoperable carcinoma of the rectum or sigmoid flexure in old women. *First and second steps:* The sigmoidal loop is brought down through a vaginal incision, anchored, opened, and ligated about rubber tubes.

silver nitrate (10 per cent.) applications, and troublesome *granulations* are destroyed with a copper stick.

Small or enormous *hernias* (Fig. 1051) resulting from colostomy openings are corrected by opening the abdomen, suturing gut and omentum, and resuturing abdominal layers snugly about the sigmoid flexure. Occasionally in urgent cases where the cancerous

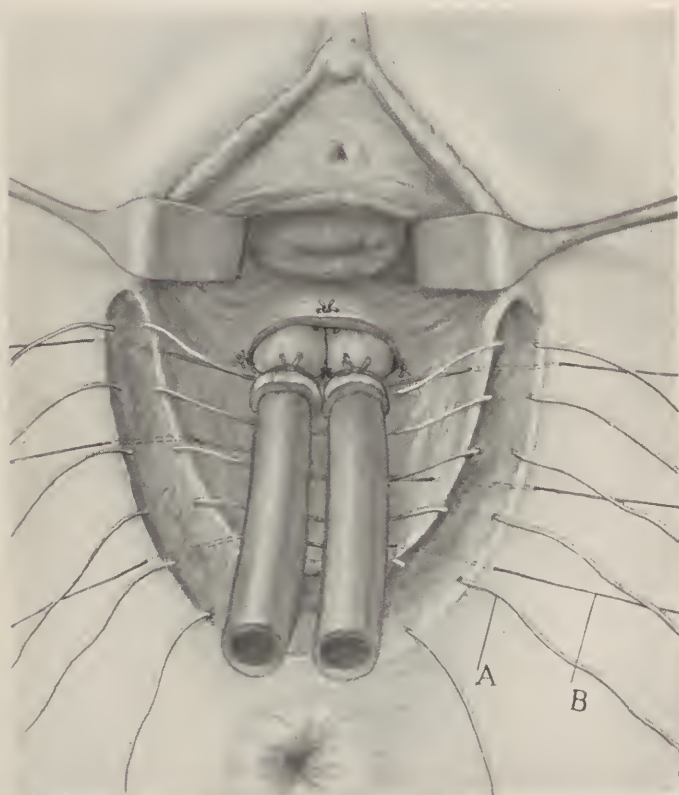


Fig. 1054.—Author's vaginal colostomy for inoperable carcinoma in women. *Third step:* The labia are freshened and (A) chromicized gut and (B) wire sutures are introduced.

bowel has been of necessity sutured in the wound, the gut and growth are excised a few days later (Fig. 1052)—*two-stage operation*.

Author's Vaginal Colostomy.—In cases of inoperable *carcinoma*, *non-malignant tumors*, *stricture*, *ulceration*, or *chronic intestinal obstruction* in old ladies and younger women preferring it the author performs his *vaginal* in preference to *abdominal colostomy*.

Patients thus operated upon were satisfied, suffered less from involuntary evacuations than from an artificial anus in the side,

and were pleased because they could sit on the toilet instead of undressing when the bowel was evacuated.

In this procedure the vagina acts as a reservoir (Fig. 1056, *R*) where feces collect, become solidified, and remain until discharged.

Vaginal colostomy has been employed to relieve lesions located in the rectum, sigmoid flexure, and colon.

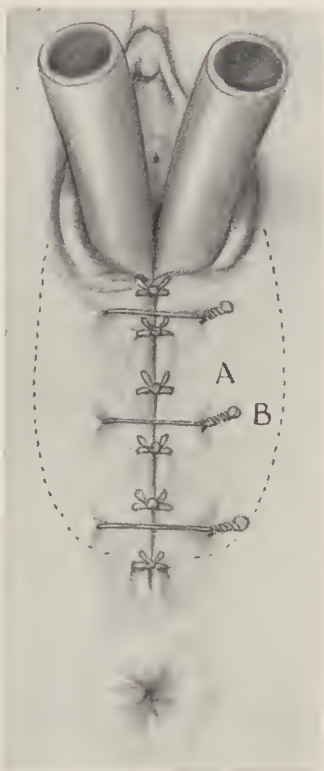


Fig. 1055.—Author's vaginal colostomy for inoperable stricture or carcinoma in women. *Fourth step:* Denuded edges of the labia are snugly closed about the rubber tubes by tying *A*, catgut, and *B*, adjusting wire sutures. Dotted line indicates the vaginal reservoir or new rectum.

Technic.—*Step One.*—The bowel is exposed and freed through a central rectus or inguinal incision, according to the character and location of the malignant or strictured bowel segment.

Step Two.—Suturing of the mesenteric border and opening of the gut is followed by the introduction and anchoring of rubber tubes in legs of the intestinal loop (Fig. 1054) projecting through a vaginal cut made for the purpose.

Step Three.—Labia are freshened and (*A*) chromicized gut and

(*B*) wire sutures are introduced subsequent to closing of the vaginal incision about the gut ends (Fig. 1054).

Step Four.—Denuded edges of the labia are snugly closed about rubber tubes by tying (*A*) catgut and (*B*) adjusting wire sutures (Fig. 1055). Dotted line indicates the vaginal reservoir or new rectum.

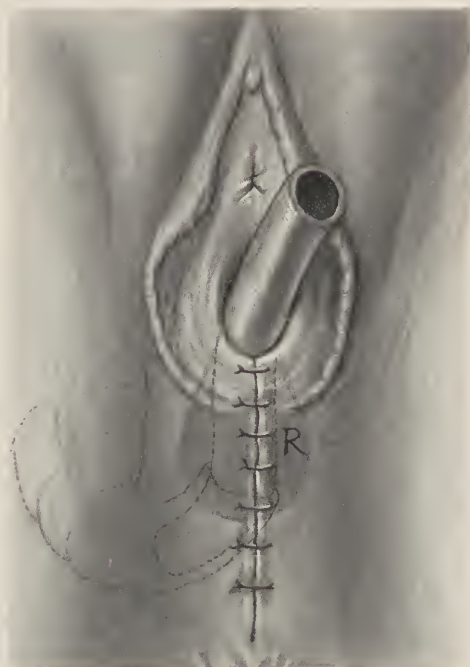


Fig. 1056.—Author's vaginal colostomy: Rectum stitched in the vaginal wound and labia freshened and sutured, making the vagina (*R*) a reservoir in which feces collect and remain until solidified, when they are evacuated with aid of an enema. This procedure is less often followed by troublesome fecal incontinence than when the bowel is attached at the end of the sacrum, normal site of the anus, when the sphincter has been sacrificed, or to skin of the abdomen.

In urgent cases instead of forming a loop and inserting two pipes, a *single rubber tube* is introduced through a slit made in the gut (Fig. 1056), and brought out through the vagina. In such cases a fecal reservoir (Fig. 1056 *R*) is made of the vagina by a subsequent operation, when the labia are freshened and approximated and the vaginal outlet is greatly diminished (Fig. 1055).

Chapter XCV

Intestinal Exclusion—Short-circuiting

ENTERO-ANASTOMOSIS, UNILATERAL EXCLUSION, BILATERAL EXCLUSION

General Remarks.—Intestinal exclusion consists in *diverting* or *shutting off* a short or lengthy segment of the small intestine, colon, or sigmoid flexure to relieve cancer or obstructing lesions causing



Fig. 1057.—Intestinal exclusion—ileosigmoidostomy—for colonic ptosis complicated by dilation, angulation, and adhesions. Distorted gut drained by ileoproctostomy.

stasis, put the involved bowel temporarily or permanently at rest to heal inflammatory and ulcerative lesions, or cure multiple papillomata, adenomata, and for other purposes hereafter mentioned.

As our knowledge of the procedure has advanced short-circuiting has rapidly gained in favor, and the operation is now being performed for a variety of conditions

During the past fifteen years the author has frequently resorted to exclusion in the *surgical*, *palliative*, and *radical* treatment of many affections of the colon, sigmoid flexure and rectum, and elsewhere. In his work, *Constipation and Intestinal Obstruction*,¹ published in 1909, the author recorded 23 cases where the operation was performed for the following conditions:

(a) Malignant obstruction.....	3
Cecum.....	1
Hepatic flexure.....	1
Transverse colon.....	1
(b) Benign stricture of the descending colon.....	1
(c) Multiple polyps of the colon and sigmoid flexure.....	1
(d) Colonic dilatation with ptosis and angulation.....	1
(e) Extensive adhesions—fibrous bands extending from the mesentery over the cecum to right abdominal parietes.....	1
Sigmoid massed in pelvis.....	1
Chronic ileocecal invagination.....	1
(f) Chronic volvulus of the sigmoid flexure.....	1
(g) Acute angulations.....	2
Splenic flexure.....	1
Sigmoid flexure.....	1
(h) Ptosis and angulation of colon.....	1
Splenic and hepatic flexures.....	1
Cecum and ascending colon.....	1
(i) Colica mucosa—spastic constipation.....	1
(j) Ulcerative colitis causing diarrhea.....	1
(k) Extra-intestinal pressure from inoperable uterine tumor.....	1
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	23

Since publication of above the author has performed exclusion in several additional cases:

Tubercular colitis.....	3
Tubercular ileocolitis.....	2
Colitis syphilitica.....	1
Retroperitoneal tumor—mesocolonic.....	1
Diverticula with peridiverticulitis.....	1
Hirschsprung's disease.....	3
Multiple papillomata.....	1
Multiple adenomata—polyposis.....	3
Neoplastic tuberculosis.....	1
Intestinal angulation with adhesions.....	1
Intra-abdominal tumor.....	1
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	18

¹ Published by W. B. Saunders Co., Philadelphia, Pa.

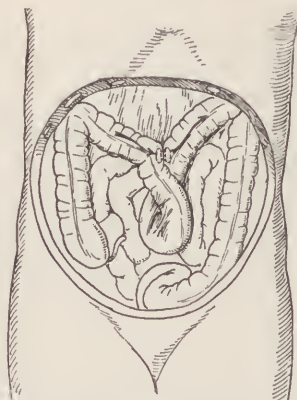


Fig. 1058.—Simple Murphy button entero-anastomosis for relief of volvulus due to colonic ptosis.

Altogether from January, 1903 to January, 1918 the author performed intestinal exclusion 41 times—*entero-anastomosis* (Fig.



Fig. 1059.—Unilateral exclusion for stricture of ascending colon. Ileum divided, both ends closed, and proximal joined to the colon—*ileocolostomy*. The ascending colon has been divided, one end closed, and the other sutured in the skin for drainage.

1065), 18; *unilateral* (Fig. 1059), 14, and *bilateral exclusion* (Fig. 1068), 9 times.

His experience in this series of cases and analysis of other statistics indicate the *immediate mortality* from these operations is approximately 5 per cent. for *entero-anastomosis*; 10 per cent. for *unilateral exclusion*, and 15 per cent. for *bilateral exclusion*, which is less than the mortality of colectomy and sigmoidectomy, which necessitate extensive mobilization of the gut that vessels may be ligated and infected glands removed.

Intestinal exclusion is seldom performed for blocking of or disease in the rectum, and is not often indicated in the treatment of *obstruction* due to *malignancy*, *volvulus*, *extra-intestinal pressure*,

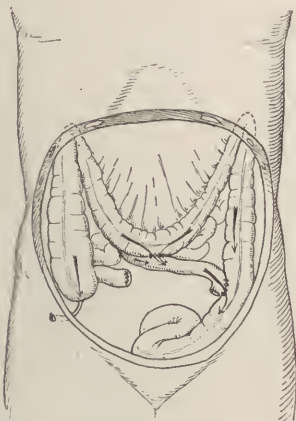


Fig. 1060.—Colonic exclusion—ileo-sigmoidostomy—for M-shaped colonic ptosis with angulation at splenic and hepatic flexures. Cecum and ascending colon drained by appendicostomy and transverse colon by ileocolostomy.

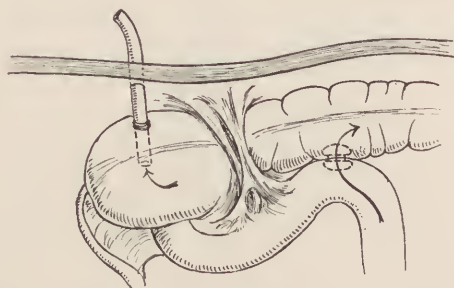


Fig. 1061.—Cancerous obstruction and adhesions at the juncture of the cecum and ascending colon temporarily relieved by ileocolostomy, cecostomy, and through-and-through irrigation.

invagination, *angulation*, *adhesions*, *ptosis*, *Jackson's membrane*, *diverticula* or *benign neoplasms*, because *resection*, *coloplication*, *colopexy*, *colostomy*, or *division of adhesions* or *Jackson's membrane*, etc., is usually preferable to *short-circuiting*, except when the lesion is inoperable or located in the small intestine, when it is a good substitute for enterostomy or colostomy.

Patients suffering from deplorable *chronic obstruction* in the small or large intestine obtain marked relief as soon as the diseased gut is excluded, and their general health rapidly improves since feces and toxins are no longer retained above the block.

Chronic diarrhea caused by *entamebic*, *bacillary*, *tubercular*, *balantidic*, *luetie*, *gonorrheal* and *catarrhal proctitis*, *colitis*, or *ileo-*

colitis is modified or cured in a comparatively short time by short-circuiting, which puts the diseased bowel completely at rest and prevents feces reaching it, which favors rapid healing of inflammatory and ulcerative lesions, mucosa of the bowel is frequently cleansed of its irritating content by lavage introduced by way of the anus or following *appendicostomy* (Fig. 1006), *cecostomy* (Fig. 999), or *Gant's ileocecostomy* (Fig. 993).

Colonic exclusion reinforced by appendicostomy or cecostomy and through-and-through medicated irrigation frequently improves the condition or cures patients suffering from papillomata or adenomata secondary to inflammatory lesions, for in such cases growths

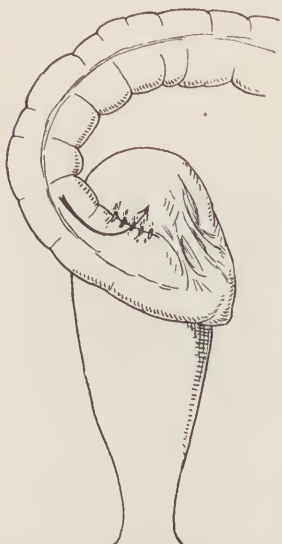


Fig. 1062.—Exclusion—proctosigmoidostomy—for angulation at the rectosigmoidal juncture caused by adhesions.

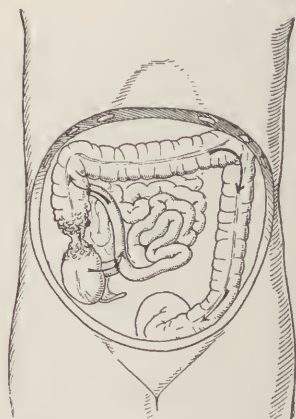


Fig. 1063.—Intestinal exclusion for carcinoma of cecum, showing ileocolostomy for obstruction and ileocecostomy for drainage.

shrink up or disappear shortly following removal of fecal irritation and repeated cleansing the mucosa of irritating toxins and discharge.

Given the choice between *exclusion* and *colostomy*, patients usually choose the former, because they object to an opening in the side and involuntary escape of gas and feces, but colostomy is preferable when inflammatory or obstructing lesions are low and the opening is made above them, since they are subsequently protected from fecal contamination and can be irrigated or treated by topical applications.

When the disease involves the ileocolic angle or small intestine entero-anastomosis is preferable to enterostomy, because it is

effective and does not have the disagreeable features of a high anus, where feces are fluid and constantly dribble through the opening to keep the skin irritated (Fig. 1022) and clothing soiled.

In most cases of inflammatory and obstructive diseases unsuitable for resection relief or a cure is obtained in a shorter time when *short-circuiting* is reinforced by *appendicostomy* or *cecostomy* (Figs. 999, 1006), which provides for drainage and through-and-through colonic irrigation.

Nearly all segments of the small and large intestine have been excluded, but the operation is employed more frequently for colonic than disease of the small intestine.

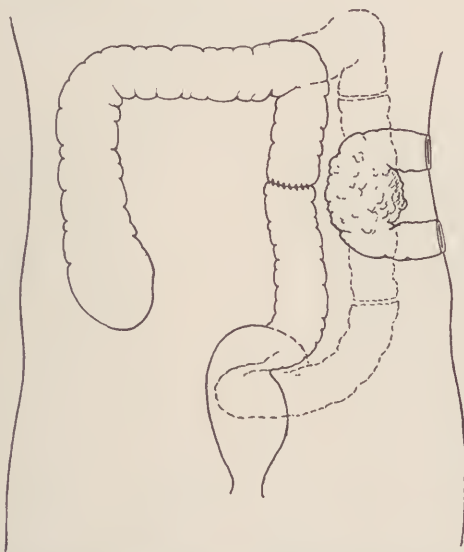


Fig. 1064.—Bilateral exclusion of colonic segment for carcinoma of descending colon with ends of bowel on either side of growth sutured to the skin to provide for drainage.

Intestinal exclusion is temporarily deferred when the patient is in a dangerous condition from obstruction or greatly exhausted by diarrhea and hemorrhages, and the involved bowel is sutured in the skin to provide drainage and permit the sufferer to recuperate, following which *short-circuiting* is performed.

When the colon is excluded by severing the small gut, closing the distal and anastomosing the proximal end with the sigmoid or rectum—ileosigmoidostomy, ileoproctostomy (Fig. 1062)—the ileum to a large extent assumes colonic function.

Following operation stools at first are *fluid and frequent*, but gradually become fewer and of thicker consistence, until in a few

weeks or months they are normal in number and appearance, by which time the ileum has enlarged and its walls become thickened.

Some authorities claim *disuse* permanently impairs the bowel function, which is not the case, for on *ten* occasions the author excluded the colon or sigmoid flexure for *periods* varying from *one* to *five* years, and following a cure of the disease re-established normal continuity of the gut, and in every instance the patient had natural evacuations and colonic absorption was not interfered with.

Intestinal exclusion is *partial* (Fig. 1062) when the main fecal current is diverted, but some feces gain access to the shut-off bowel,

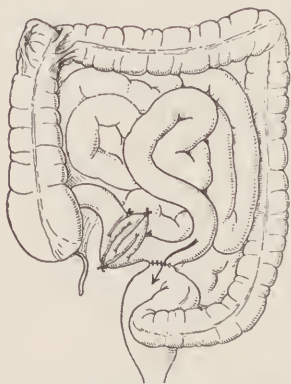


Fig. 1065.—Intestinal exclusion—ileo-proctostomy, entero-anastomosis—showing author's method of preventing regurgitation by angulating the ileum. Operation for obstructive adhesions situated at the hepatic flexure.

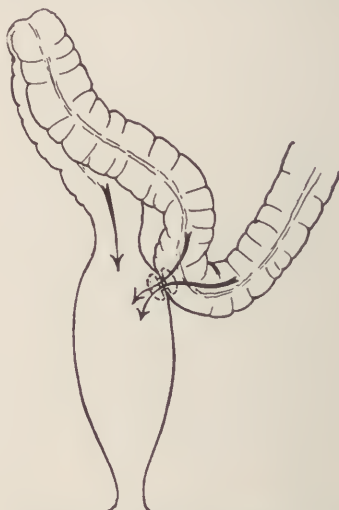


Fig. 1066. — Short-circuiting — recto-sigmoidostomy; lower arrows indicate direction of fecal current: upper arrow, drainage of the excluded loop.

and *complete* (Fig. 1064) when the entire intestinal content is prevented from entering the *short-circuited* gut.

Technic.—The small intestine, colon, or sigmoid may be excluded by (a) simple entero-anastomosis, (b) unilateral exclusion, or (c) bilateral exclusion.

In either case the patient is *prepared* as for other laparotomies and the abdomen is opened and explored through a free median, left, or right rectus incision with patient in the Trendelenburg position, the wound being held widely apart with a self-retaining retractor. The desired segments of gut are located, examined,

and walled off with gauze packs and the type of exclusion indicated is made.

In a series of cases intestinal segments are joined laterally end-to-end or end-to-side, using through-and-through reinforced by seromuscular linen or silk sutures for all except urgent cases, when anastomosis is hastened through employment of a Murphy button.

Entero=anastomosis.—In this procedure (Figs. 1065, 1066) division of the gut is unnecessary, since the proximal above is joined with the distal segment of gut below the obstructed or diseased area by *lateral* anastomosis (Figs. 1065, 1066). The operation is not always satisfactory because there is nothing to prevent part of the feces from entering the diseased intestine unless the bowel is angulated (Fig. 1065) after the author's plan.

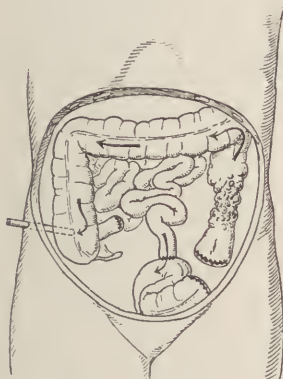


Fig. 1067.—Unilateral intestinal exclusion—ileorectostomy—for inoperable carcinoma of descending colon. Excluded segment of bowel drained by cecostomy.



Fig. 1068.—Bilateral intestinal exclusion for cancer of ileum. Ends of healthy bowel anastomosed and ends of diseased gut jointed to the sigmoid flexure—ileo-sigmoidostomy—to procure drainage.

Unilateral Exclusion.—Here (Fig. 1067) the bowel is closed on one side above or below the lesion and the ileum or colonic segment is united with the healthy bowel below by *ileocolostomy*, *sigmoidostomy* or *rectostomy*, *colocolostomy*, *colosigmoidostomy*, *cecosigmoidostomy*, or *coloproctostomy*. In such cases exclusion may be accomplished by entero-anastomosis or severing the ileum, closing the distal end and joining the proximal ileum to the sigmoid flexure or rectum below the divided, inverted, and closed sigmoidal or colonic stump.

Bilateral Exclusion.—In this procedure (Fig. 1068) the bowel is excluded by dividing, inverting, and closing the gut on both sides of the diseased area and anastomosing healthy gut ends,

but when the proximal and distal colonic extremities cannot be brought together they are closed, the ileum is divided near the cecum, the upper end being closed and the lower joined with or to the sigmoid or rectum by lateral end-to-end anastomosis.

In one or two instances instead of closing them excluded gut ends were sutured in the skin to provide them with drainage and irrigation.

For a detailed discussion concerning the author's technic employed in the many types of intestinal exclusion the reader is referred to Chapter XXXV of Gant's Constipation, Obstipation, and Intestinal Stasis,¹ devoted to the subject.

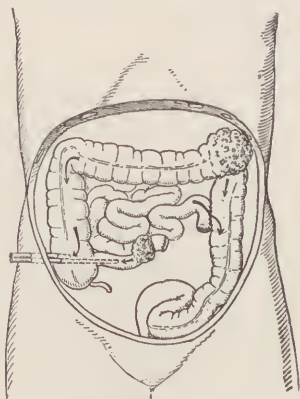


Fig. 1069.—Intestinal exclusion—ileo-colostomy—and Gant's double catheter ileocecostomy for cancers involving the splenic flexure and ileum.

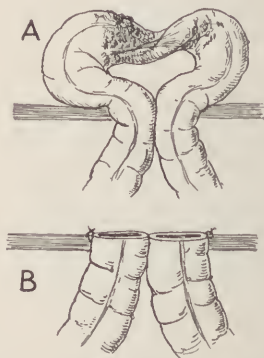


Fig. 1070.—Intestinal exclusion for stricture, ulceration, and adhesions: *A*, Diseased bowel sutured outside the abdomen; *B*, appearance of colostomy openings following amputation of gut—two-stage operation.

Regurgitation responsible for distention pain and auto-intoxication are frequent complications of intestinal exclusion operations as usually performed. In 1910 the author elsewhere—Constipation and Intestinal Obstruction—illustrated and published his method of preventing regurgitation, which consists in scarifying, doubly angulating, and suturing the bowel after the plan shown in Fig. 1065, which effectively prevents escape of feces into the excluded intestine.

This procedure is not universally satisfactory because the diseased bowel often continues to secrete a discharge that accumulates and produces annoying or serious manifestations.

In all cases of unilateral and bilateral exclusion the author during the past decade has made a practice of *draining* the short-

¹ Published by W. B. Saunders Co., Philadelphia.

circuited diseased intestine by an *appendicostomy* (Fig. 1060), *cecostomy* (Fig. 1061), *colostomy* (Fig. 1071), *suturing one or both ends in the skin* (Fig. 1071), or making a *communication between diseased and healthy segments of gut* (Fig. 1063).

With this provision the involved bowel can be irrigated at will to keep it clean, thereby preventing accumulation of the discharge and development of toxic manifestations.

Colonic exclusion frequently makes a good substitute for *colostomy* in inoperable cases of intestinal obstruction caused by

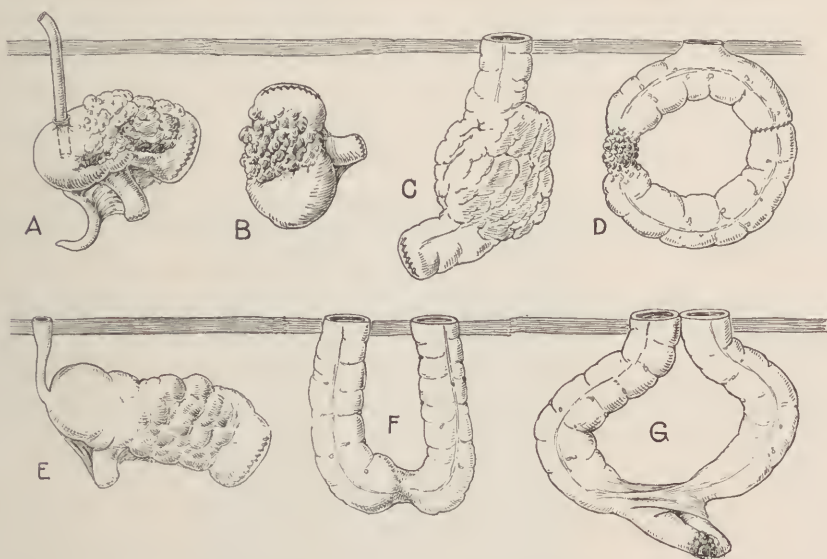


Fig. 1071.—Methods of draining diseased bowel when excluded for inoperable cancer or other chronic ulcerative and obstructive diseases.

cancer or other lesions, but *appendicostomy* and *cecostomy* are preferable to short-circuiting where the bowel is inflamed or ulcerated, except in deplorable cases where the mucosa is extensively destroyed and freedom from fecal contamination is essential, and when the ileum is diseased and the patient prefers exclusion to enterostomy.

In about 50 per cent. of operations the author has combined *exclusion* with *appendicostomy* or *cecostomy*, and results have been gratifying since drainage thus established facilitates convalescence.

Ileosigmoidostomy or *ileorectostomy* (Fig. 1066) is preferable to *cecosigmoidostomy* or *colosigmoidostomy* because the operation is less dangerous and can be performed in a shorter time owing to difficulty of mobilizing colonic segments for anastomosis.

Exclusion is rarely indicated for lower bowel affections, since the operation is difficult, hazardous, and applicable only for disease situated in the upper rectum, at the rectosigmoidal junction or higher up.

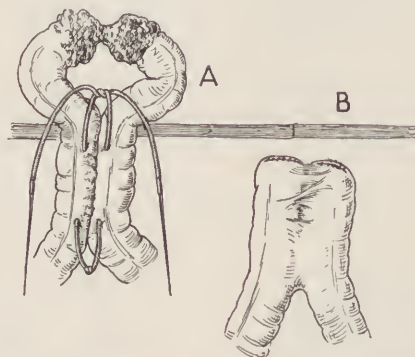


Fig. 1072.—Three-stage operation of bilateral exclusion for annular carcinoma: *A*, Anastomosis with McGraw's ligature and amputation of growth; *B*, colostomy opening closed weeks later.

In concluding his discussion of intestinal exclusion the author wishes again to emphasize the value of this procedure in the treatment of chronic *inflammatory* and *obstructive* lesions of the small and large intestines, for the operation is deserving of greater popularity than it has yet attained.

Chapter XCVI

Closure of Artificial Anus—Colostomy Opening—and Fecal Fistula

BEFORE discussing methods of eliminating colostomy openings and fecal fistula the author will briefly state the differentiating points between these conditions.

An **artificial anus** is a communication *voluntarily* made by the surgeon between the large or small intestine and the body surface to aid in relieving or curing obstructive or other intestinal lesions. Usually the opening is made in the colon, most often in the lower



Fig. 1073.—Radiograph of a fecal fistula injected with Beck's paste.

central abdomen or inguinal region, and *all feces* must be voided through it, otherwise the artificial anus will not accomplish the object for which it was made.

Fecal fistula (Fig. 1029) is a superficial or deep sinus extending between bowel and skin through which fluid feces are discharged, while a large or small amount of semisolid or firm feces is usually evacuated through the rectum, and usually results from penetrating or gunshot wounds, abdominal operations, intestinal, appendical, or deep-seated abscess, strangulated hernia or perforation from worms, benign or malignant ulceration, foreign bodies, or instrumentation.

Often when attempting *colostomy* surgeons make a fecal fistula by suturing the colon or sigmoid to the inner abdominal wall or

skin without making a spur (Fig. 1029), consequently when the gut is opened feces escape both through the opening and rectum.

Closure of an Artificial Anus.—It is more difficult to eliminate an artificial anus where adhesions bind legs of the colonic loop together than to close simple fecal fistula because the *spur* must be destroyed before bowel continuity can be restored.

In *temporary colostomy*, where the gut has not been amputated, but opened by a transverse or longitudinal incision (Fig. 1074), the stoma is easily eradicated by freshening and approximating its edges, infolding the bowel, and burying the sutured area by *coloplication*, using interrupted linen Lembert or other stitches (Fig. 1075).

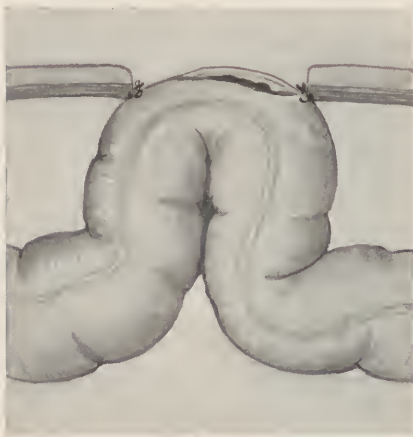


Fig. 1074.—Method of suturing and opening bowel longitudinally in temporary colostomy.

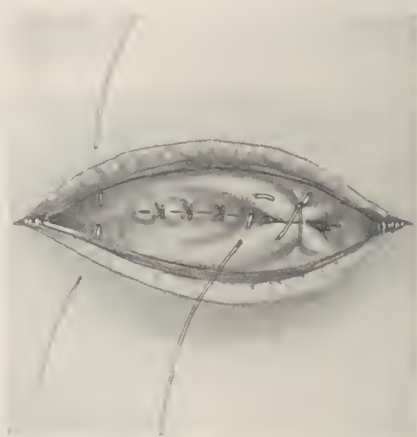


Fig. 1075.—Method of closing the stoma extraperitoneally under local anesthesia when the gut is opened longitudinally in temporary colostomy.

Permanent artificial ani may be closed by an extraperitoneal *two-step* operation, where the opening is eliminated by suture following destruction of the spur with a Gant valve clamp (Fig. 1078) or enterotome, or by resection, which is more tedious and dangerous.

Author's Clamp Operation.—This procedure is safe because simple, and the artificial anus is closed without entering the peritoneal cavity, both steps in the operation being performed under eucain— $\frac{1}{8}$ per cent.—anesthesia.

Having emptied and cleansed gut segments above and below colostomy openings, arrested or controlled peristalsis by an opiate, and swabbed mucosa with hydrogen peroxid or surgical iodine, the patient is ready for operation.

After stripping the spur with index-finger and thumb to exclude

coils of small intestine in the colonic angle with aid of a special applicator, one of the author's large strong fenestrated steel *valve*

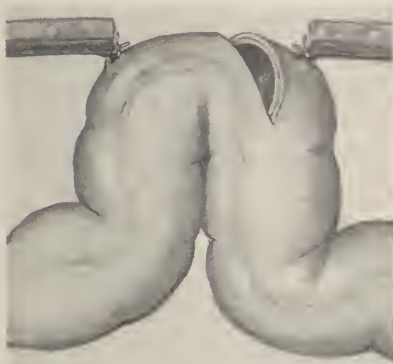


Fig. 1076.—Method of opening gut transversely in temporary colostomy.

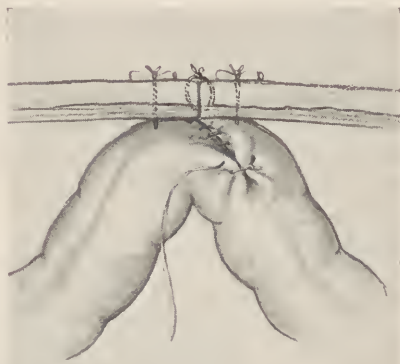


Fig. 1077.—Method of closing stoma extraperitoneally under local anesthesia when bowel has been opened transversely in temporary colostomy.

clamps is applied by introducing one blade in either opening and pushed inward until it includes the entire spur within its grasp,

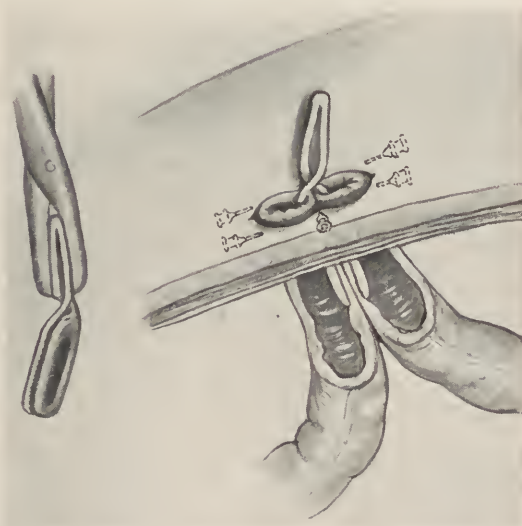


Fig. 1078.—Author's method of closing stoma extraperitoneally under local anesthesia. *First step:* The partition separating lumens of the proximal and distal ends of the sigmoid is divided by pressure necrosis with a Gant rectal valve clamp left *in situ*.

when it is released from the applicator forceps (Fig. 1078). The clamp is permitted to remain *in situ* from six to nine days or until

it *bites out the spur* by pressure necrosis, causing soreness but no pain or hemorrhage, during which time the patient is kept in bed on fluid diet.

Dupuytren and other surgeons have invented enterotomes and forceps for destroying the spur, cumbersome instruments that project through dressings and annoy the patient by their weight, over which the author's *valve clamp* possesses several advantages, viz.: it rests flat on the abdomen, weight is imperceptible, requires but a moment to apply, readjustment is unnecessary to increase pressure, and the blades are of sufficient size, $\frac{1}{2}$ inch (12.70 mm.) broad and $1\frac{1}{4}$ inch (3.18 cm.) in length—or larger—is applied with

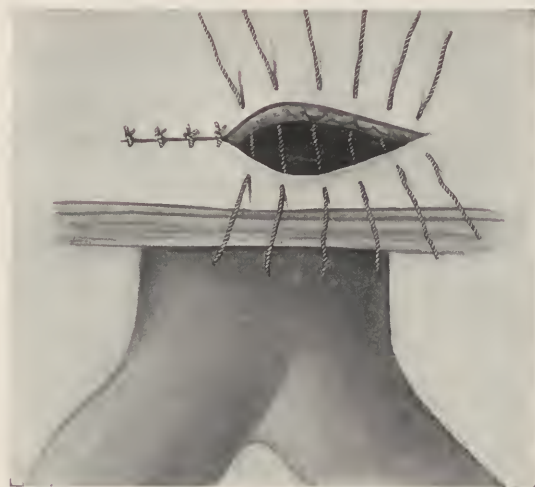


Fig. 1079.—Author's method of closing stoma extraperitoneally under local anesthesia. *Second step:* Following anesthetization of skin and other structures outer extremity of gut ends are dissected free and excised; the abdominal wound is then closed with deep and superficial sutures.

the patient recumbent in bed, and instead of splitting it like an enterotome, brings the entire spur away when it drops off. Immediately after the clamp sloughs out the patient is permitted to get up and go about while the gut wound is healing.

Finally, the opening is closed without entering the peritoneal cavity by infiltrating tissues on all sides with eucain, removing mucous membrane from surrounding structures, joining fascia and musculature with a continuous chromic gut lock-stitch, approximating skin edges with interrupted linen or gut sutures (Fig. 1079), and tying three silkworm-gut, retention strands previously passed through the abdominal wall when needed; dressings are applied after the wound has been treated with iodine.

The author has 5 times closed artificial ani by his *extra-peritoneal clamp* and *suture* operation, with *primary union* in 3 and partial breaking down of the suture line in other instances, necessitating an additional minor plastic operation.

Resection with Anastomosis.—When for any reason the clamp procedure is not feasible for closing a fecal fistula or an artificial anus (Fig. 1080, *A*), gut ends are freed, amputated, and joined together by Murphy's button, or sutured in the following manner:

First Step.—Bowel openings are sterilized and sealed by a purse-string or running suture placed in the mucosa (Fig. 1080, *B*).

Second Step.—The gut with spur is quickly freed by a circumferential incision made $\frac{1}{2}$ inch (12.70 mm.) from the artificial anus (Fig. 1080, *C*).

Third Step.—The bowel is doubly clamped and divided with knife, scissors, or cautery on both sides not less than 1 inch (2.54 cm.) from the spur (Fig. 1080, *C*).

Fourth Step.—The proximal is anastomosed with the distal stump by end-to-end or side-to-side anastomosis using through-and-through reinforced by linen seromuscular sutures about a rubber tube (Fig. 1080, *D*), or Murphy's button in urgent cases.

Fifth Step.—The abdominal wound is closed by the layer method, using plain for the peritoneum and chromic gut for the fascia (Fig. 1080, *E*).

Some surgeons lose considerable time in dissecting the gut from its attachments, which the author quickly accomplishes by opening the abdomen $\frac{1}{2}$ inch (12.70 mm.) from the artificial anus, inserting the finger as a guide, and making a few bold cuts around the opening, leaving a rim of tissue attached to the intestine (Fig. 1080, *B*).

The discharge from previously excoriated skin or mucosa is occasionally responsible for partial or complete breaking down of the wound following closure of an artificial anus.

Closure of Fecal Fistula.—The plan selected for closing fecal fistula (Fig. 1081, *A*) depends on the cause of the trouble, location and size of the opening, and duration and length of the sinus.

Occasionally when the opening is recent and small, the tract is short and only small amount of feces is discharged through it, the sinus heals spontaneously, or a cure is accomplished by keeping the patient in the recumbent posture, prescribing a diet that leaves a coarse residue, administering an opiate and bismuth to lessen peristalsis and make evacuations fewer and more firm, cauterizing or fulgurating the skin and sinus with silver or copper stick, Paquelin or electric cautery, or high-frequency fulgurating spark, and insert-

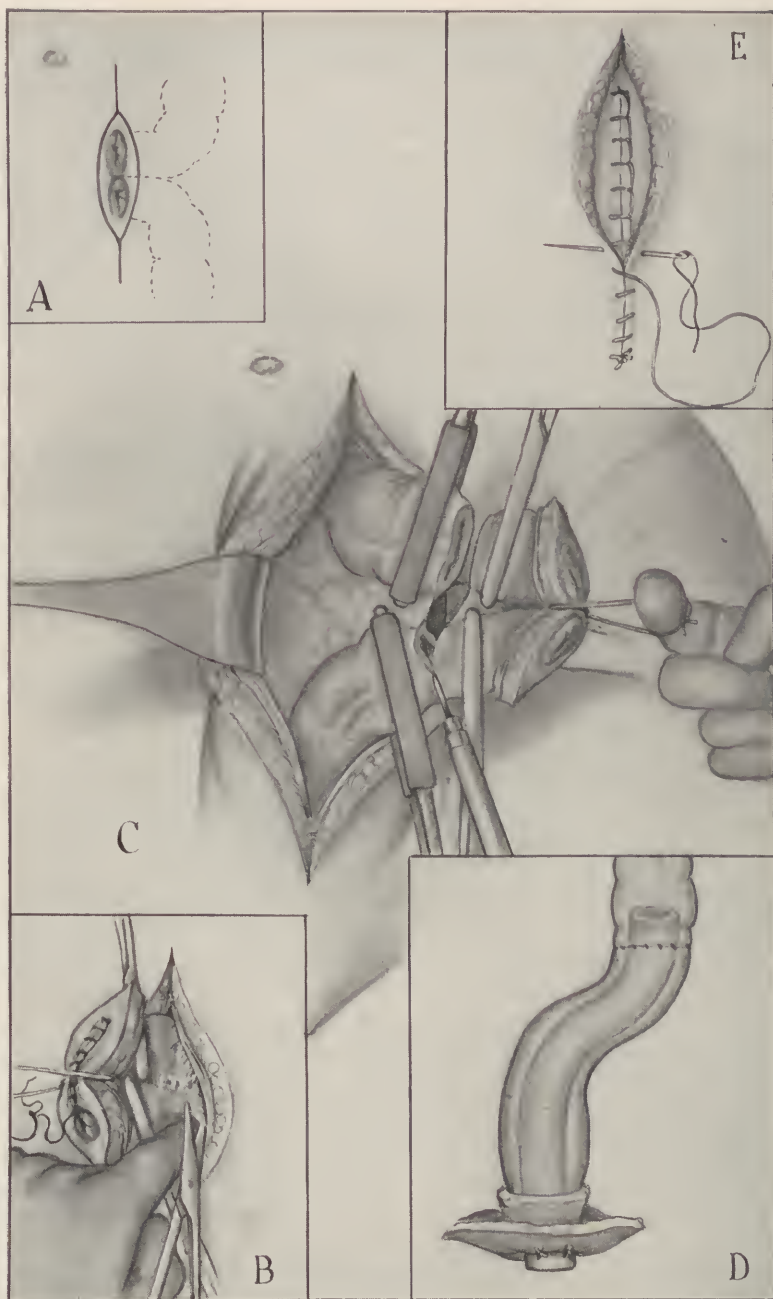


Fig. 1080.—Author's method of closing an artificial anus: *A*, Double-barreled appearance of colostomy opening; *B* shows opening closed to prevent leakage and gut being freed from the abdominal wall with scissors, using the finger as a guide; *C*, gut ends doubly clamped and being excised with cautery; *D*, bowel anastomosed about a rubber drainage-tube; *E* shows fascia closed, and skin edges being approximated.

ing a diminutive gauze drain, which stimulate healing of the tract.

Deep and tortuous sinuses require excision, which the author performs in the following manner:

First Step.—Through a free incision the sinus is freed by careful step-by-step dissections to its juncture with the bowel, doubly

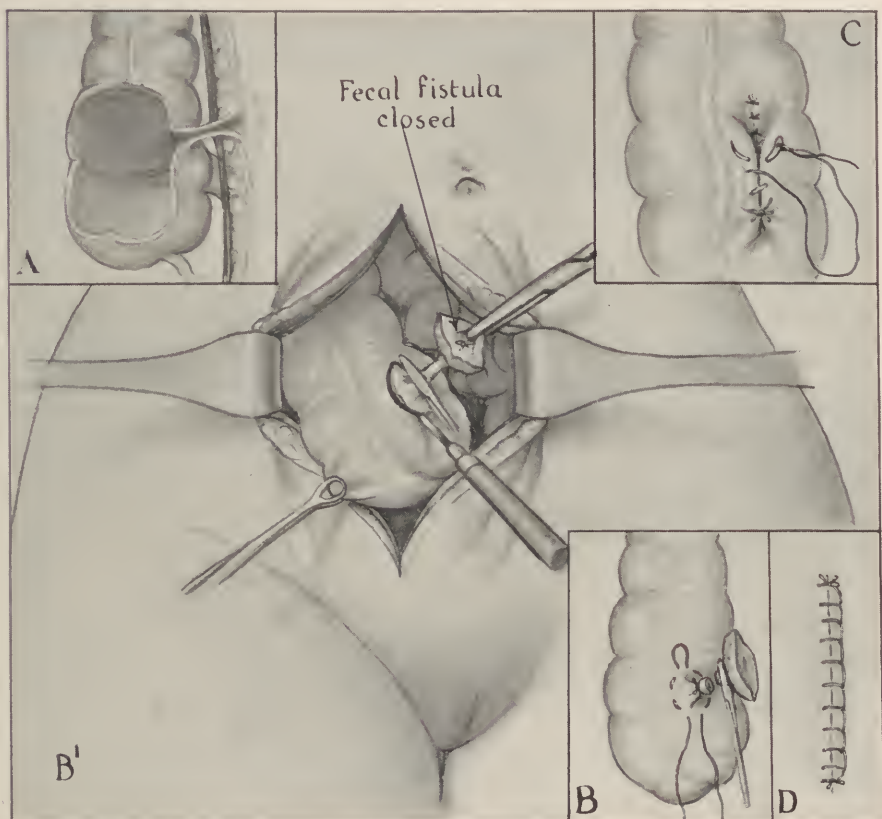


Fig. 1081.—Author's method of closing fecal fistula: A, Fecal fistula; B, C, D, successive steps in the operation of choice for its closure; B' and C show method of excising sinus and closing gut wound when the cautery is employed.

clamped, and severed with cautery at a safe distance from the gut (Fig. 1080, B').

Second Step.—The stump is inverted as in appendectomy and the bowel sutured over it (Fig. 1081, B, C).

Final Step.—Deep abdominal structures are approximated layer by layer, and the skin wound is closed by lock-stitch (Fig. 1081, D), interrupted, or silkworm-gut sutures *after integument*

with subcutaneous fat has been mobilized so that the external suture line does not lie over the closed opening in the bowel.

The involved segment of gut is covered by an omental graft sutured to the serosa of the parietes or adjacent organ, or suspension stitches are introduced, which when tied approximate the peritoneal covering of the abdomen with that of the bowel, which minimizes danger of peritonitis should intestinal sutures give way.

Instead of ligating and burying the internal extremity of the fistula, it may be excised by elliptic incision and the bowel rent closed by a double suture line (Fig. 1081, *B*¹, *C*, *D*).

Colonic fistulæ with large openings through which nearly all feces escape are not suitable for the above procedures, and are most satisfactorily closed by resecting the gut and establishing continuity by end-to-end or other anastomosis after the plan employed in closing artificial ani (Figs. 1079, 1080).

Considerable ingenuity is required in the eradication of fecal fistula in a series of cases, but the underlying principle in all operations, according to Bier, is to *separate the suture line from the skin by a layer of healthy adipose tissue*, and in this way either obtain a primary closure of the opening in the gut, or in case this fails, to promote secondary closure by making the sinus an oblique and tortuous one.

Postoperative treatment of fecal fistula is the same as for closure of an artificial anus previously given.

Chapter XCVII

Colonic, Sigmoidal, Rectal, and Anal Diseases of Infancy and Childhood

WHEN the author went to college no effort was made to teach *anorectal* affections of infants and children, nor do they today receive deserved attention in Undergraduate and Postgraduate Medical Schools or current medical literature. The time has arrived when more attention should be paid to the diagnosis and treatment of this class of affections, the frequency of which is indicated by the accompanying table of anorectal diseases treated by the author.

Formerly there was, but now there is no longer excuse for not diagnosing lesions involving the sigmoid flexure and rectum, because they can be recognized by the aid of fluoroscopy and can be accurately inspected through the proctosigmoidoscope or detected by digital examination.

A large experience in clinic and private work has convinced the author that the discomfort and pain occurring in infancy and childhood is incident to rectocolonic and anal affections more often than the profession realizes, and they frequently go unrecognized or untreated by indifferent or ignorant physicians. The author has successfully treated many cases of slight and serious diseases involving the lower bowel which had been overlooked or incorrectly handled because celebrated pediatricists failed to make either a digital or proctoscopic examination of the anorectal region.

Frequently easily diagnosed ailments of this class are without reason considered unimportant, and parents are told by the family physician not to worry, as in all probability the child will outgrow them, which in most instances is a mistake, since they gradually become worse, and later in childhood or adult life require a slight or serious operation to correct them.

Colonic and sigmoidal are more difficult to diagnose than anorectal diseases, and in doubtful cases abdominal palpation, percussion, succussion reinforced by colonic inflation, sigmoidoscopy, fluoroscopy, and radiography are required to complete the diagnosis. When these means fail, exploratory laparotomy becomes imperative when the infant or child exhibits dangerous abdominal manifestations.

AUTHOR'S 263 CASES OF ANORECTAL AFFECTIONS OCCURRING IN INFANTS AND CHILDREN¹

No. of diseases.	Diagnosis.	No. of cases.	Male.	Female.	Cured.	Improved.	Unimproved.	Died.
1	Congenital deformities.....	10	6	4	8	..	..	2
2	Sequels following operations for deformities.....	9	5	4	3	5	1	..
3	Coccyx, tumors and cysts of.....	3	2	1	2	1	..	..
4	Coccyx, deviation of (anterior and posterior).....	2	1	..	1	..	..	..
5	Coccyx, fractures of.....	2	2	..	2	..	..	..
6	Coccydynia.....	1	..	1	1	..	..	..
7	Coccyx, congenital absence of.....	2	2	..	2	..	..	..
8	Dermoid, sacral.....	2	1	1	2	..	..	..
9	Cyst (sebaceous) anal.....	1	1	..	1	..	..	..
10	Lipoma of buttocks.....	2	1	1	2	..	..	..
11	Sarcoma, anus and buttocks.....	1	..	1	..	..	..	1
12	Carcinoma, rectal.....	1	1	..	..	..	..	1
13	Procidentia (mucosa only).....	27	15	12	20	5	2	..
14	Procidentia (mucosa and muscular coats).....	7	3	4	6	1	..	..
15	Polyps (single).....	15	6	9	15	..	..	..
16	Polyps (multiple).....	6	4	2	4	1	1	..
17	Fissure (single, 16; double, 1).....	17	8	9	17	..	..	..
18	Ulcers, non-specific (single, 2; multiple, 6).....	8	4	4	8	..	..	..
19	Ulcers, syphilitic (congenital anus or vulva).....	6	2	4	5	1	..	..
20	Ulcer, tubercular.....	1	1	..	1	..	..	1
21	Ulcer, diphtheric.....	1	..	1	..	..	..	..
22	Stricture—congenital syphilis, 1; foreign body, 1; injury, 1.....	3	2	1	2	1	..	..
23	Chancroids, anal.....	1	..	1	1	..	..	..
24	Venereal warts, con. acuminata, 1; lata (syphilitic), 1.....	2	..	2	2	..	..	..
25	Gonorrhea.....	5	2	3	5	..	..	..
26	Proctitis, acute.....	6	4	2	6	..	..	..
27	Proctitis, chronic.....	9	5	4	7	1	1	..
28	Erosions of anus and skin.....	7	3	4	7	..	..	..
29	Abscesses—ischio-rectal, 4; marginal, 4; submucous, 3.....	11	7	4	10	1	..	..
30	Abscess, sacral (dermoid), 1.....	1	1	..	1	..	..	..
31	Fistula—complete, 4; b-internal, 3; b-external, 1.....	8	5	3	8	..	..	..
32	Fistula—rectovaginal.....	1	..	1	1	..	..	..
33	Fistula—tubercular, local, 1; with general tuberculosis, 1.....	2	1	1	1	..	1	..
34	Hemorrhoids—external, thrombotic.....	8	4	4	8	..	..	..
35	Hemorrhoids—external, cutaneous.....	5	3	2	5	..	..	..
36	Hemorrhoids, internal (complicating constipation).....	2	1	1	2	..	..	..
37	Impaction, fecal (rectal).....	15	8	7	15	..	..	..
38	Impaction from seeds and fruit stones.....	5	4	1	5	..	..	..
39	Injuries (severe laceration of rectum and anus).....	4	3	1	3	1	..	..
40	Foreign bodies (fish-hooks, bones, coins, etc.).....	4	4	..	4	..	..	..
41	Pruritus ani.....	3	1	2	2	1	..	..
42	Thread-worms.....	3	2	1	3	..	..	..
43	Round-worms.....	2	1	1	2	..	..	..
44	Hypertrophied anal papillae.....	1	1	..	1	..	..	..
45	Patulous anus (from pederasty).....	1	1	..	..	1	..	..
46	Sphincters, anal and urinary (paralysis of).....	3	2	1	..	1	2	..
47	Sphincter, hypertrophy of.....	11	6	5	11	..	..	..
48	Defecation, painful, from abnormally small anus.....	7	4	3	7	..	..	..
49	Defecation, difficult, from overlapping anal skin folds.....	3	2	1	2	1	..	..
50	Fecal incontinence (following operation).....	2	1	1	..	1	1	..
51	Hypertrophy of the rectal valves.....	2	1	1	1	1	..	..
52	Rectocele, posterior.....	1	1	..	..	1	..	..
53	Bifurcated rectum.....	1	1	..	..	1	..	..
Total.....		263	146	117	223	26	9	5

¹ This table was published in American Medicine several years ago, since which time the author has treated many other infants and children suffering from the same and other diseases mentioned in this and the following tables.

SUMMARY TABLE

Different diseases treated.....	53
Number of cases treated.....	263
Males.....	146
Females.....	117
Number of cases cured.....	223
Number of cases improved.....	26
Number of cases unimproved.....	9
Number of deaths.....	5
	263
Number of venereal diseases treated.....	14
Congenital syphilis—male, 2; female, 4.....	6
Chancroids—male, 0; female, 1.....	1
Venereal warts—male, 0; female, 2.....	2
Gonorrhea.....	5
	14

Tact is essential when dealing with children, and it is impossible to ascertain the character of the bowel trouble before gaining their confidence with the aid of a trick or story, following which one is able to complete a satisfactory examination in most instances.

In some quarters the opinion prevails that infants and children cannot be examined with the proctoscope or finger without a general anesthetic, which is not the case, since the sphincter and musculature of the anal canal relaxes sufficiently when the warm finger or instrument is first *gently* placed against the anus for a few seconds and then slowly inserted into the bowel as the child's attention is distracted by conversation or otherwise.

The rectum must be examined slowly from the anus upward, and it should be borne in mind that 80 per cent. of all anorectal affections—*pin-worms, fissures, ulcers, polyps, hypertrophied papillæ, inflamed crypts, hemorrhoids, and muscular irritability*, responsible for *constipation*, are encountered in the anal canal, a fact not understood by many physicians and surgeons, who miss or overlook them through suddenly introducing the finger or proctoscope well into the upper rectum.

The treatment of anorectal affections in infancy and childhood does not necessarily mean *operative interference*, since the majority are curable by correcting errors in diet, regulating stools, irrigating the bowel, making topical applications to lesions, or prescribing a vermifuge for helminths.

Since the *etiology, pathology, symptoms, diagnosis, medical and surgical* treatment of anorectal diseases of adults, many of which to a degree apply to children, have been discussed in previous chapters, the author will not consider them fully here.

Above the author has subdivided and tabulated a series of 363 cases of *anorectal and colonic* affections of infancy and child-

hood treated by him in twelve years to indicate the *frequency*, *variety*, and *curability* of this class of diseases, including *anorectal affections*, *anorectal obstipation—constipation*, *abdominal obstipation—surgical constipation*, and *enterocolitis* and *proctitis*.

GENERAL REMARKS ON THE TREATMENT OF ANORECTAL DISEASES

Most diseases of infancy and childhood are curable through correcting errors in diet, regulating stools, medication, topical applications, and rectocolonic irrigations reinforced by other non-operative therapeutic measures; nevertheless many of the affections referred to below require surgical intervention, but operation need not cause alarm, since in the majority of instances it is performed in less than ten minutes under eucaïn or novocain *infiltration anesthesia*, and the mortality is practically *nil*.

Gas-ether or *chloroform* is preferable for extensive anorectal and abdominal operations and for infants and young children, who, through *fear of being hurt*, are difficult to place and keep in a proper posture.

Congenital Anorectal Anomalies.—Deformities and troublesome *sequelæ* the result of operations performed for their relief are encountered in infants and children with surprising frequency. In such cases the bowel is partially or completely occluded, manifestations of obstruction are evident, and the infant usually dies within a few days unless promptly relieved.

This may be accomplished by *dividing bands*, *excising membranous partitions*, *splitting the strictured anal canal*, or making a *deep incision*, *dissecting the bowel free*, *bringing it down*, and *suturing it in the anal region* if the rectum ends in a blind pouch 1 inch (2.54 cm.) or more above the anus. When obstructive symptoms are serious and the bowel terminates high or communicates with the bladder or urethra through a fistulous opening, the formation of an *artificial anus* is imperative, for in this class of cases it is unsafe to attempt to correct the deformity until the child is older and can withstand radical operation necessary to correct the anomaly.

The Last Illness of the Blazek (Grown-together) Twins.—As a matter of interest the author has included a short description and photographs (Figs. 1082, 1083) of the Blazek twins, who possessed but a single rectum and anus, and who recently died in Chicago.

Josefa died of profound cholemia, March 30, 1922 at 2.25 A. M., and Rosa twelve minutes later.

They were cared for by Doctors Cunat and Breakstone, and to the latter's description in *American Medicine* I am indebted for the basis of this brief *résumé* concerning these celebrated twins:

"As the photographs show, between each one's thighs there was a vaginal orifice, but, on turning the patients on their sides, we found the anal orifice directly behind where the thighs of both join, so that this orifice was in the middle of both twins, and was, therefore, a *common anus*.

"On bimanual examination I found that Josefa had a rudimentary vagina with no hymen, and rudimentary uterus, whereas Rosa, who had the linea stria, had a lacerated perineum, a normal



Fig. 1082



Fig. 1083

Blazek twins who had a common rectum and anus. Fig. 1082, front view; Fig. 1083, back view. (Dr. Benjamin H. Breakstone, in "American Medicine.")

uterus, with a lacerated cervix. On *exploring the rectum I found it was common to both*. Rosa gave birth to a perfectly normal child several years ago.

"Palpating the connection between both twins, I found that the connection was mostly of soft parts, varying in diameter between 9 and 15 inches, and I could make out a bony union between both ilia, as well as a probable union between the ends of both sacra, terminating in a common coccyx.

"**Bowel Movements.**—They both had a rectum in common.

We could tell whose bowels moved by watching the abdomen. Especially when Josefa was much jaundiced, and Rosa was not, Josefa's bowels were slate colored, whereas Rosa's were normal. Josefa was constipated most of the time, whereas Rosa had more or less normal bowel movements.

"There is every reason to believe that, barring accidents, the operation might have been successful, in so far as Rosa was concerned. We could have saved the existing rectum for Rosa, and if Josefa also lived we could have made an artificial rectum or have done a colostomy. The cutting through of soft parts and bony tissue would probably not have been a difficult matter."

A few of the author's earlier cases of anorectal anomalies have been incorporated in the table on page 447.

Coccygeal Displacements, Fractures, Dislocations, Etc.—When the coccyx is abnormal and causes pain, constipation, or rectal perforation, it is excised in five minutes by the author's operation elsewhere described.

Sacrococcygeal cysts containing fluid, sebaceous matter, hair, or supernumerary limbs may be tapped or treated by carbolic acid or iodine injections when inoperable, but removal of the tumor and contents is indicated unless the child cannot withstand the operation.

Fissure in Ano.—In contradistinction to superficial perianal cracks and erosions incident to dermatologic lesions and congenital syphilis, typical *fissures* are characterized by a deep clear-cut rent located in the posterior anal commissure that incites sphincteralgia.

Symptoms are constipation, sphincteralgia, painful defecation, and blood-streaked stools.

Diagnosis is based upon the symptoms and exposing the fissure with the author's slanting anoscope or speculum.

Medical treatment consists of softening stools with fruit or other laxatives, and daily applying silver nitrate or ichthyol (6 per cent.) to the lesion.

Surgical Treatment.—When the above measures fail, gradual or forcible divulsion of the muscle or division of the sphincter under infiltration anesthesia, followed by wound drainage and topical applications of silver nitrate or ichthyol (10 per cent.) to the wound, may be relied upon to effect a cure.

Ulcers.—Lesions located at or near the anus require the same treatment as fissures except, in addition, they are curetted before muscles are incised. When ulcers are chronic and caused by catarrhal or ulcerative infectious coloproctitis, the involved bowel is daily irrigated with balsam of Peru or ichthyol (2 per cent.) alternated

SYNOPSIS OF 8 CASES OF CONGENITAL MALFORMATION OF THE RECTUM AND ANUS TREATED BY THE AUTHOR

No.	Sex.	Age.	Variety of deformity.	Treatment.	Result.
1	M.	36 hours.	Anus occluded by membranous tissue.	Membrane incised and anus dilated with finger.	Recovery.
2	F.	22 years.	Natural anus. Imperforate rectum opening into vagina, through which all feces were voided.	Rectal end of fistula freed from vaginal wall by elliptic incision. End of the rectum reached by a second incision, opened, brought down, and sutured in the normal anal site.	Recovery; partial incontinence.
3	M.	2 days.	Rectum ended in a pouch a finger length above the anus; fistulous communication between bowel and bladder.	Colostomy after efforts to reach and bring the rectum down failed.	Death five hours later.
4	M.	24 hours.	Anal aperture partially covered by skin.	Integument cut away and anus divulsed.	Recovery.
5	F.	5 days.	Imperforate rectum; anus natural.	Condition not suspected by attending physician until child was moribund, when I was called; operation refused.	Death in a few hours.
6	M.	2 weeks.	Congenital narrowing of both rectum and anus.	Divulsion with bougies gave temporary relief; iliac colostomy eventually performed.	Recovery; still living.
7	F.	3 days.	Rectum ended in blind pouch, 1 inch (2.54 cm.) above the anus.	Incision carried backward and upward until the rectum was located, opened, and united to skin at anal site.	Recovery; stricture.
8	M.	4 days.	Imperforate anus caused by fibrous partition extending entirely across lumen of the bowel about 1 inch (2.54 cm.) above the anus.	Membrane incised; trimmed off. Rectum divulsed immediately and at intervals of one week for six months.	Recovery; slight constriction at site of original trouble.

with olive oil and bismuth mixture injections when the mucosa is highly inflamed and sensitive. If the patient is syphilitic, salvarsan or mercury is administered, and when pulmonary tuberculosis is a complication hygienic and therapeutic measures that will strengthen and cause the patient to put on weight are prescribed.

In aggravated cases of *chronic, catarrhal, amebic, bacillary, balantidic, luetic*, or *tubercular* ulcerative coloproctitis that do not respond to rest in bed, correcting errors in diet, medication, and

bowel irrigation *per anum*, *appendicostomy*, *cecostomy*, or the author's *ileocecostomy* is indicated that through-and-through colonic medicated flushing may be instituted. When the large intestine *only* is involved, *appendicostomy* or *cecostomy* will suffice, but if both the ileum and colon are diseased Gant's *ileocecostomy* is indicated because afterward the small and large intestines may be individually or simultaneously irrigated.

Procidentia Recti.—In this condition one or more rectal tunics extrude through the anus, forming a cone-shaped tumor having a slit in the distal end. *Symptoms*, except protrusion, are unimportant, and the *diagnosis* is made by inspecting the protruding gut as the child strains downward.

Medical treatment consists in correcting any condition causing diarrhea and straining, keeping stools semisolid, having the patient defecate while in the recumbent posture, and snugly strapping the buttocks together following the placing of a pyramidal-shaped compress over the anus to prevent extrusion of the gut.

Surgical Treatment.—Many have been suggested, but the following procedures alone or in combination are the most dependable for curing varying degrees and types of *procidentia ani*, *recti*, and *sigmoidæ* in infants and children. When mucosa only extrudes, *linear cauterization*, *excision* as in Whitehead's operation, *ligation* and *excision* of the mucous membrane at different points under local anesthesia or placing a *purse-string suture* about the rectum just above the anus to incite the sphincters to frequent contraction and cause them to become *hypertrophied*, have all proved satisfactory in the author's hands.

Procidentia recti, with prolapse of both mucosa and muscularis, is corrected by *excising a cuff of mucosa*, *plicating muscular tunics*, *approximating edges of the divided mucous membrane*, and removing a *diamond-shaped flap*, including a segment of the sphincter when the patient has a patulous anus and fecal incontinence.

In cases of *procidentia sigmoidæ* with extensive protrusion of bowel through the anus a cure is effected by the procedures recommended for *procidentia recti* reinforced by suspension of the sigmoid to the abdominal wall—*sigmoidopexy*.

The author has abandoned excision in all cases of rectal prolapse both in children and adults because the procedure must be repeated at short intervals.

Hemorrhoids.—*External thrombotic*, the result of a ruptured vein and formation of a clot caused by straining and *cutaneous hemorrhoids*—*skin-tabs*—are fairly common, but *internal varicose piles* are very rare in infants, children, and young adults.

The **symptoms** of external hemorrhoids are a swelling, slight pain or discomfort at stool, and the principal manifestation of internal hemorrhoids are bleeding and occasional protrusion.

Treatment.—Discomfort from piles is minimized by hot fomentations made to the anus to allay sphincteric irritation, applying a sedative astringent solution or ointment to the inflamed area and keeping evacuations soft.

Surgical treatment varies according to the type of pile troubling the patient.

External thrombotic are infiltrated with eucain, *slit open*, *cureted*, and *drained*; *skin-tabs—cutaneous hemorrhoids*—are injected with the anesthetic, *excised with scissors*, and wounds are permitted to heal by granulation; *internal hemorrhoids* are exposed with the author's anoscope, infiltrated with eucain, withdrawn, *ligated*, and *excised*. The *clamp* and *cautery*, and *Whitehead's* operations are never justified in this class of cases.

A study of the accompanying tables will give the reader an idea of the author's experience with hemorrhoids occurring in infants, children, and young adults.

AUTHOR'S 17 CASES OF HEMORRHOIDS ENCOUNTERED IN INFANTS AND CHILDREN WHOSE AGES WERE FROM ONE MONTH TO TWELVE YEARS

No.	Sex.	Age.	Variety.	Cause or complication.
1	M.	1 month.	Thrombotic.	Constipation.
2	M.	2 months.	Thrombotic.	Congenital anorectal syphilis.
3	F.	5 months.	Cutaneous—skin-tag.	Congenital anorectal stricture.
4	M.	6 months.	Sentinel.	Fissure in ano and constipation.
5	M.	6 months.	Thrombotic.	Imperforate anus.
6	M.	8 months.	Cutaneous.	Ulcerative proctitis.
7	F.	1 year.	Internal venous.	Thread-worms and constipation.
8	F.	11 years.	Thrombotic.	Narrow anal canal.
9	M.	18 months.	Thrombotic.	Constipation.
10	M.	2 years.	Internal capillary.	Chronic diarrhea.
11	F.	2 years.	Skin-tags.	Congenital anorectal syphilis.
12	M.	3 years.	Thrombotic.	Scar following operation for atresia ani.
13	F.	4 years.	Internal venous.	Constipation.
14	M.	5 years.	Thrombotic.	Imperforate rectum operation.
15	M.	9 years.	Cutaneous.	Tubercular ulcerative coloproctitis.
16	F.	11 years.	Thrombotic.	Procidencia recti.
17	M.	12 years.	Internal venous.	Constipation and plimosis.

AUTHOR'S 19 CASES OF HEMORRHOIDS ENCOUNTERED IN CHILDREN AND YOUNG ADULTS BETWEEN THIRTEEN AND TWENTY YEARS OF AGE

No.	Sex.	Age.	Variety.	Cause or complication.
1	M.	12 years.	Thrombotic.	Constipation.
2	F.	13½ years.	Thrombotic.	Atresia ani.
3	M.	14 years.	Venous.	Round-worms and constipation.
4	M.	14½ years.	Cutaneous.	Stricture following operation for imperforate rectum.
5	F.	15 years.	Venous.	Constipation.
6	F.	15 years.	Cutaneous.	Congenital anorectal syphilis.
7	M.	15½ years.	Thrombotic.	Constipation and phimosis.
8	M.	16½ years.	Thrombotic.	Foreign body and straining.
9	M.	17 years.	Thrombotic.	Procidencia recti.
10	M.	17½ years.	Venous.	Narrow anal canal.
11	M.	17½ years.	Venous.	Multiple rectal polyps.
12	M.	18 years.	Thrombotic.	Anal stricture from fistula operation.
13	F.	18 years.	Cutaneous.	Entamebic colitis and diarrhea.
14	M.	19 years.	Thrombotic.	Constipation.
15	M.	19½ years.	Thrombotic.	Constipation.
16	F.	20 years.	Capillary.	Rectal procidentia.
17	M.	20 years.	Thrombotic.	Large fibrous polyps.
18	M.	20 years.	Venous.	Tubercular colitic.
19	M.	20½ years.	Venous.	Without apparent cause.

The author has treated more than 100 young adults for external and internal hemorrhoids whose ages range from twenty to twenty-five years.

Inflamed crypts and hypertrophied anal papillæ, occasionally associated with diarrheal diseases of infants and children, are *excised with forceps and scissors* in a moment following their anesthetization with eucain.

Stricture.—*Bandular* and *membranous* are not uncommon, but cicatricial strictures are rare in infants and children. **Symptoms** of stenoses are constipation, fecal impaction, gas retention, and straining at stool. **Diagnosis** is made by inspecting the anus and examining the rectum with the finger and inspecting the rectum through a proctoscope, when the size, character, and location of the constriction can be determined.

Treatment.—Medical measures—dieting and keeping stools fluid and soft—are not *curative*, but render the patient more comfortable through procuring satisfactory evacuations. Stenoses of all kinds are operated at the earliest opportunity, and the procedure employed is chosen in accordance with character of the occluding lesion. *Bands* extending across the anus or rectum are *divided* and membranes partially or completely blocking the bowel are *excised* with the aid of forceps and scissors.

The caliber of strictures located in the lower rectum is tem-

porarily increased by *gradual* or *forcible* divulsion, accomplished with fingers, dilator, or proctoscope, but better results are obtained when the stenosis is *divided* at one or more points under local or general anesthesia by means of *internal* or *external proctotomy* elsewhere described and illustrated.

Rectal constrictions located above the attachment of peritoneum and bowel are never divulsed or incised because death usually ensues from peritonitis when the bowel is ruptured or perforated, hence troublesome high-lying stenoses are generally treated by *colostomy* and years later by *excision* of the stricture when the child is older and can better withstand a radical operation.

Anorectal Abscess.—The author has operated upon anorectal abscesses 50 times in boys and girls from ten to fifteen years old, and 10 times in children varying in age from one to ten years, 1 of which was less than a week old.

Rectal infection is quite common, but *superficial* and *deep* perianal and perirectal *abscesses* are rare in babies and children. In such cases localized swelling is usually preceded by disease accompanied by erosion or ulcers in the rectal mucosa, and *staphylococci*, *streptococci*, and *colon bacilli* are the predominating organisms found in pus taken from marginal ischiorectal and other abscesses encountered in the anorectal region.

Characteristic **symptoms** are anorexia, rise in temperature, continuous throbbing pain, swelling, and redness of the skin over the infected area.

Diagnosis is based upon the manifestation and palpation, which reveals a small or extensive hardened sensitive swelling located in close proximity to the anus, the skin over which is reddened.

Treatment.—Severe pain is alleviated by an opiate, applications of hot poultices, and emptying the bowel with a warm enema, measures that are discontinued as soon as the patient can be made ready for operation, because abscess is a surgical disease. Simple *puncture* and *evacuation* of pus immediately relieves pain, but the procedure is to be condemned because it is invariably followed by fistula. A secondary operation for fistula is always avoided when abscesses are radically operated on, which consists in *freely incising the infected area in all directions, removing necrotic tissue with the curet, clearing up pockets, and completing the operation by irrigating and tightly packing* the abscess cavity with gauze to arrest bleeding. Thereafter the wound is daily irrigated with boric acid and *drained*, but not *packed*.

Incision includes the sphincter when there is an opening into the rectum or when the bowel wall is necrotic.

Anorectal Fistula.—Sinuses in this region may be superficial or deep, single or multiple, long or short, but in either case they are the result of a subcutaneous marginal, ischial, perirectal, or other type of improperly treated abscess.

Fistulæ in infants and children, as in adults, may be classified as *complete internal*, *complete external*, *blind internal*, *blind external*, *horseshoe*, and *pelvirectal*. Unimportant tracts may be *submucous*, *subcutaneous*, or penetrate through deeper structures.

The author has operated upon patients for *fistula* whose ages varied from three days to eighty years; the disease is usually encountered in persons from twenty-five to forty-five years of age or during the active periods of life.

He has operated for fistulæ upon infants, children, boys and girls, and young adults 40 times, whose ages were as follows:

<i>Infants</i>			
Three days.....	1	Two months.....	1
Three weeks.....	1	Four months.....	1
Six weeks.....	1	Six months.....	1
<i>Children</i>			
Seven months.....	1	Six years.....	2
Nine months.....	1	Eight years.....	1
Ten months.....	1	Nine years.....	1
One year.....	1	Ten years.....	1
Three years.....	2	Eleven years.....	2
Four years.....	1	Twelve years.....	1
<i>Boys, Girls, and Young Adults</i>			
Twelve years.....	2	Eighteen years.....	3
Fourteen years.....	1	Nineteen years.....	2
Fifteen years.....	2	Twenty years.....	3
Sixteen years.....	1	Twenty-one years.....	5

Total 40

Sinuses the result of *dermoid cysts* located on the outer surface of the sacrum are not uncommon, lead from a *postanal dimple*, and when incised contain long detached hairs.

Symptoms of fistulæ are not distressing further than irritation of the skin incident to the discharge unless the sinus becomes blocked, when throbbing pain ensues. Fistulous tracts are *diagnosed* by getting a history of previous abscess, observing an opening or discharge in or outside the anus, detecting a linear submucous or subcutaneous induration by palpation, and radiographing the sinus (Figs. 1084, 1085).

Treatment.—Time is not wasted with useless palliative measures, and the author invariably *divides*, *curets*, and *drains* fistulous tracts in infants and children just as soon as the parents' consent



Fig. 1084.—Radiograph (front view) of a high anopelvic fistula encountered in a girl three years of age. The sinus resulted from an abscess that formed following excision of a sacrococcygeal tumor-teratoma containing teeth, hair, sebaceous material, etc.: *A*, Abscess cavity; *F*, fistula.

to operation is obtained. *Excision* of sinuses in this class of cases is impracticable.



Fig. 1085.—Same case with radiograph taken with the patient lying on left side: *A*, Abscess cavity; *F*, fistula.

Fecal incontinence the result of fistula or other operation, or disease or tumor involving the brain or lumbar cord, is partially or completely relieved by producing an artificial *anal stricture* by

linear cauterization, removing scar tissue, and approximating sphincter ends together with skin edges, and in shortening the muscle anteriorly and posteriorly, as elsewhere described.

Foreign bodies, smooth and pointed, are removed with forceps through the proctoscope, but when large or encysted they are extracted following anesthetization of and divulsion or division of the sphincter muscle.

Hypertrophied rectal valves which are a rare cause of constipation in children are divided by pressure necrosis by placing a Gant valve clamp upon them.

Fecal impaction the result of accumulated feces, seeds, or fruit stones not evacuated with copious soapsuds or oil enemata are broken up with finger or scoop introduced through a proctoscope and washed out.

Divulsion or division of the sphincter is occasionally necessary in the evacuation of hard, dry, mucus-covered feces.

Pruritus Ani.—Troublesome itching of the anal region, occasionally encountered in infants and children, is usually the result of pin-, thread-, round-, or tapeworms, coloproctitis, congenital or other superficial fissures in the skin, and seeds or foreign bodies lodged or caught in mucous membrane and skin folds.

Treatment.—Pin-worms are destroyed by strong salt water irrigation or painting mucocutaneous surface with silver nitrate (8 per cent.), and round- and tapeworms are eliminated with vermifuges reinforced with measures elsewhere described.

Erosions incident to mucoid discharges the result of catarrhal or infectious proctitis are relieved by ichthyol or balsam of Peru (2 per cent.) rectocolonic irrigations and topical applications of silver nitrate (6 per cent.) to raw areas.

Superficial fissures from whatever cause are quickly healed by applying argyrol 25 or silver nitrate 6 per cent. applications made to cracks three times weekly. *Seeds* causing irritation are removed with a swab, and *foreign bodies* caught in mucosa are extracted with forceps. An operation is necessary only where itching is caused by polyps, enlarged anal papillæ, or inflamed crypts, the removal of which is followed promptly by relief.

Venereal warts—*condyloma acuminata* and *lata*—exceedingly rare in infants and children, are excised with scissors following eucainization of the skin, when cleaning and dusting the parts with a combination of calomel and tannic acid powder fail to destroy them.

Erythema, eczema, and other skin lesions encountered in the perianal region of children are treated after the manner recommended for similar diseases occurring in adults previously discussed.

Cancer.—*Epitheliomata*, *carcinomata*, and *sarcomata* have all in rare instances been encountered in the anorectal region of children.

The author treated 3 lads, sixteen, seventeen, and twenty; 6 girls, fifteen, seventeen, and eighteen; 2 nineteen and twenty years of age for *carcinoma*, and a youngster eleven years old afflicted with *sarcoma* involving the anorectal region. From his experience and a study of recent statistics he believes cancer is more common in persons under twenty years than the profession realizes.

Owing to the rarity of malignancy in the colon and rectum of infants and children, and the previous discussion elsewhere of cancer in all its phases, the author will not consider the subject further here, except to say that malignancy in any form wherever found in the bowel should be *excised* at the earliest opportunity.

Obstipation—Chronic Intestinal Obstruction—Surgical Constipation.—Infrequent and incomplete evacuations of infants and children usually attributed to *chronic-atonic constipation* are induced by *obstructing lesions* located in the colon, sigmoid flexure, and rectum, or at the anus more frequently than the profession realizes; the majority of obstructions causing constipation are easily diagnosed and eliminated by operation with little danger to the patient. If the different types of *surgical constipation* were duly appreciated, recognized early, and correctly treated the distress of many constipated patients who are usually permitted to suffer through life would be avoided.

Ordinarily, lesions responsible for painful defecation, costiveness, and fecal impaction occurring in infants and children are located near the anus, which makes them easy to diagnose and cure, though occasionally *the block* is in the upper rectum, sigmoid flexure, or colon, and laparotomy is necessary in their correction.

The author divides obstipation or surgical constipation into two classes—*anorectal* and *abdominal*.

Anorectal constipation is easily diagnosed by inserting the finger or inspecting the bowel through a proctoscope for three successive days, which reveals feces in the middle or upper rectum if the obstruction is *low*, or their absence here when the block is *high* and situated in the sigmoid or colon.

Children and adults notice a *weight* and *fullness* in the rectum when the obstruction is *near the anus*, while patients suffering from obstructive lesions located above the *rectosigmoidal juncture* do not complain of the above sensations, though they have not had an evacuation for two or three days.

Enemata are of diagnostic value in this class of cases, for when a *small* ($\frac{1}{2}$ pint) procures a movement it is an indication of rectal obstipation, but when a larger (1 quart or more) enema is required to evacuate feces, the block is evidently above the rectum.

Obtaining a history, noting obstructing manifestations, abdominal palpation, fluoroscopy, and radiographs, one or all may be necessary in diagnosing abdominal obstipation. In rare instances exploratory laparotomy may be required, and in such cases the obstructing lesion is eliminated while the abdomen is opened.

That an idea may be formed as to the number and variety of obstructing lesions responsible for *anorectal* and *abdominal obstipation* and *auto-intoxication* the author has tabulated his cases below:

AUTHOR'S 70 CASES OF ANORECTAL MECHANICAL CONSTIPATION
(OBSTIPATION) IN INFANTS AND CHILDREN UNDER TWELVE
YEARS OF AGE OR YOUNGER

No. of diseases.	Causes and complications.	No. of cases.	Male.	Female.	Cured.	Improved.	Unimproved.	Died.
1	Fissure in ano	10	6	4	10			
2	Ulceration, non-specific	4	2	2	3	1		
3	Ulceration, congenital syphilitic	2	..	2	1	1		
4	Stricture, congenital syphilitic	1	1	..	..	1		
5	Stricture, traumatic (encysted chicken bone)	1	1	..	1			
6	Stricture from sloughing (extravasation of urine)	1	1	..	..	1		
7	Congenital deformities (complete and incomplete occlusion)	10	6	4	8	..	..	2
8	Congenital deformities, operations following sequelæ	7	4	3	4	2	1	
9	Coccyx, anterior deviation of	1	1	..	1			
10	Coccyx, congenital absence of, with anal opening at sacral termination	1	1	..	..	..	1	
11	Coccyx, congenital absence of, causing posterior rectocele	1	..	1	..	1		
12	Bifurcated rectum	1	1	..	..	1		
13	Impaction from seeds and fruit stones	5	4	1	5			
14	Ascarides lumbricoides, impaction from	1	..	1	1			
15	Foreign bodies	4	4	..	4			
16	Polypi	4	3	1	3	1		
17	Hypertrophy of anal papillæ	1	1	..	1			
18	Hypertrophy of sphincter	11	6	5	11			
19	Hypertrophy of rectal valves	2	1	1	1	1		
20	Sarcoma	1	..	1	..	..	..	1
21	Carcinoma	1	1	..	..	..	..	1
	Total	70	44	26	54	10	2	4

AUTHOR'S 36 CASES OF ABDOMINAL-MECHANICAL OBSTIPATION THAT OCCURRED IN CHILDREN UNDER TWELVE YEARS OF AGE

No. of diseases.	Causes and complications.	No. of cases.	Male.	Female.	Cured.	Improved.	Unimproved.	Died.
1	Hirschsprung's disease.....	3	1	2	..	2	1	
2	Dilatation of colon.....	8	5	3	..	5	3	
3	Colonic ptosis.....	4	2	2	..	2	2	
4	Invagination of sigmoid flexure into rectum.....	7	3	4	5	1	1	
5	Adhesions following typhoid.....	2	1	1	1	1		
6	Adhesions following localized peritonitis.....	1	..	1	1			
7	Adhesions following appendectomy.....	..	1	..	..	1		
8	Angulation sigmoid flexure (congenital).....	1	1	..	1			
9	Angulation hepatic flexure (cord binding to abdominal wall).....	1	1	..	..	1		
10	Volvulus, partial (chronic).....	3	1	2	2	..	1	
11	Enterospasm, chronic intermittent (foreign body in sigmoid).....	1	1	..	1			
12	Mesentery abnormally long (twisting and adhesions).....	1	1	..	..	1		
13	Mesentery abnormally short (angulation).....	1	..	1	1			
14	Hypertrophy of O'Beirne's sphincter....	2	1	1	..	2		
	Total.....	36	19	17	12	16	8	0

COMBINED STATISTICS OF ANORECTAL AND ABDOMINAL OBSTIPATION

No. of diseases.	Causes and complications.	No. of cases.	Male.	Female.	Cured.	Improved.	Unimproved.	Died.
21	Anorectal mechanical constipation (obstipation).....	70	44	26	54	10	2	4
14	Abdominal mechanical constipation (obstipation).....	36	19	17	12	16	8	0
35	Total.....	106	63	43	66	26	10	4

In studying these statistics of 106 cases of *obstipation* tabulated in the accompanying tables it is interesting to note the large number (35) and widely varying conditions entering into their causation.

Nearly all cases of *anorectal obstipation* were cured or greatly benefited, there being no improvement in but 2 instances, and only 4 deaths occurred in the 70 cases. The results obtained are no better than one would expect because of the simple nature of most rectal ailments causing the trouble and their easy curability. Of the 4 deaths, 2 were due to cancer, and the others to acute

obstruction from congenital deformities, and all 4 patients were beyond recovery when seen.

Fourteen different lesions accounted for the 36 cases of *abdominal obstipation*, and results in this series show that 12 were cured, 16 improved, and 8 not benefited. The results obtained were fair, but not so good as those following the treatment of rectal obstipation, but this is not surprising because lesions were more serious and laparotomy necessary.

About one-half of the constipated infants and children examined by the author suffered from *mechanical obstruction* of one kind or another. This statement appears startling since *habitual constipation* is usually considered a medical ailment, but it must be remembered that the author's work is largely surgical and for a number of years he has taken great interest in the treatment of *surgical constipation* and frequently written and lectured upon this topic. This would naturally lead to his getting such cases, whereas the internist would receive the *atonic* type. Experience, however, warrants the author in believing that the cause of constipation is of a mechanical (surgical) nature very much more frequently than physicians and surgeons recognize, and occurs in about 25 per cent. of the cases.

Anorectal Obstipation.—The most frequent causes of obstructive constipation in infants and children are *congenital anorectal anomalies, fissure in ano, polyps and ulcers in the anal canal, and narrowing of the anal canal, hypertrophy of the sphincter, levator ani muscles, anterior deviation of the coccyx, narrowing of the rectosigmoidal juncture, and hypertrophied rectal valves* discussed in previous chapters.

Narrowing of the anal canal frequently responsible for constipation in children is easily corrected by occasionally *stretching* the anus with fingers or an anal dilator with or without general anesthesia, and more permanent and better results, however, are obtained by *incising* the lower rectum in the posterior median line under eucain or novocain infiltration anesthesia as in fissure operations. When consent to operation cannot be obtained comfortable stools are usually procured by dieting, laxatives, and low enemata.

When spasmodic or tonic contractions of a *hypertrophied sphincter* or *levator ani muscle* is responsible for painful defecation and incomplete bowel movements, relief is to be immediately had from *splitting* the irritable muscle or forcibly *divulging* the anal canal under local or general anesthesia, the former being preferable.

Occasionally *anterior deviation of the coccyx* is responsible for obstinate constipation, and is relieved only by *excising* lower segments of the bone after the author's plans elsewhere described.

Narrowing at the rectosigmoidal juncture the result of irritability or hypertrophy of O'Beirne's sphincter, causing obstipation, is overcome by *divulsing* the narrowed gut with a soft-rubber bougie or an inflatable bag shown in the chapter on Obstipation of Adults.

Hypertrophied rectal valves, extremely rare in children, are rendered non-obstructive by *dividing them with the author's valve clamps* elsewhere illustrated.

Abdominal Obstipation.—*Extra-intestinal pressure, malignant tumors, polyposis, enteroliths, hernia, diverticula, and coloptosis* frequently encountered in adults are seldom responsible for obstipation in infancy and childhood; because of this and their having been discussed elsewhere they have not received full consideration here.

The most common obstructive lesions responsible for infrequent and incomplete stools in children are *adhesions, veil-like membranes, angulations, Lane's kink, volvulus, invagination*—*intussusception*—*enterospasm, stricture, and congenital dilatation of the colon*—Hirschsprung's disease.

Exudative are eliminated by wiping intestinal segments apart with gauze, *band-like* are severed with knife or scissors, and broad sheath-like *adhesions* are removed by ligating and dividing them at either extremity.

Veil-like—*Jackson's membranes*—are treated in a manner similar to broad adhesions just discussed.

Angulations are corrected by *dividing* adhesions, constricting or pulling upon the gut, and suturing the intestine to the inner parietes or adjacent structures.

Lane's kink is in the main treated after the manner employed in dealing with bowel angulations.

Volvulus due to bands are relieved by severing them with scissors, but when the twist is due to ptosis of the colon or sigmoid flexure the condition is cured by *colopexy* or *sigmoidopexy* previously described.

Invagination of the cecum and sigmoid flexure has, in the author's practice, proved one of the most frequent and obstinate causes of obstipation in infants and children. Fortunately, it is easily remedied by attaching the bowel to the abdominal wall on the right side—*cecopexy*—or on the left side—*sigmoidopexy*—the latter being performed more frequently than the former.

Enterospasm occurs more frequently in infancy and childhood than the profession realizes, and may be incited by a constricting band, ulcerative colitis, fruit seeds or stones, foreign body, or any-

thing that irritates the gut and causes a simultaneous contraction of both circular and longitudinal muscle-fibers. When not relieved by hot water drinking, hot fomentations, castor oil, high warm enemias, administration of belladonna to relieve muscular contraction, a surgical condition should be suspected unless there is a reason for believing the trouble is caused by intestinal worms or foreign body.

Foreign bodies are removed through the sigmoidoscope with the author's special forceps; seed and fruit stones are washed out after impaction is broken up with finger or gouge through the proctoscope.

In case enterospasm is caused by adhesions or other abdominal intestinal lesion and symptoms are not abated in the above manner the abdomen is opened and the kink, adhesion, or twist eliminated by operation.

Stricture, an occasional sequel of chronic ulcerative colitis, is a serious condition because laparotomy and colonic *resection* are necessary for a cure or the establishment of an *artificial anus* is required when the child is too young to withstand a longer operation. Operative interference should be postponed as long as normal or fairly satisfactory evacuations are procurable with dieting, laxatives, and high enemias.

Congenital dilatation of the colon—Hirschsprung's disease—is a strictly surgical ailment, and medical measures are contraindicated except to keep the bowel empty until an operation is performed.

Altogether but 5 cases of genuine Hirschsprung's disease have come under the author's observation, concerning 3 males and 2 females; 2 patients were under one year of age, 1 was ten, 1 eighteen, and 1 thirty years of age.

In this class of cases the enlarged and elongated ptotic colon is *plicated* and *suspended to the abdominal wall* at one or more points—*colopexy*—*resected* or short-circuited—*ileosigmoidostomy*. These procedures and *colectomy* occasionally performed to relieve complete obstruction will not be discussed further, as they have received due consideration in preceding chapters.

Atonic Constipation.—This type of costiveness, the result of dietary indiscretions, lack of exercise, gourmandizing, invalidism, eating at indiscriminate hours, consuming improper or poorly cooked food, medication, and emptying the bowel at irregular hours, is relieved and occasionally cured by medication, dieting, and physical measures previously described in the chapter on Chronic Constipation of Adults, but dosage, etc., must be modified in accordance with the age of the patient.

The accompanying prescriptions will be found useful in emergency cases:

R. Syrupi rhei aromat..... ℥ss 15 00;
 Ext. fluid rhamni purshianæ..... ℥iij 12 00;
 Glycerini..... q. s. ad. ℥ij 60 00.—M.

Sig.—One teaspoonful daily for a child three to five years of age.

R. Sodii phosphatis..... gr. xxiv 1 6;
 Syrupus mannæ..... ℥iiss 76 0;
 Aquæ anisi..... q. s. ad. ℥iij 92 0.—M.

Sig.—A teaspoonful thrice daily for a child under one year.

R. Fluidextract rhei..... ℥xxvj 1 0;
 Fluidextract ipecacuanhæ..... ℥iij 0 2;
 Sodii bicarbonatis (bicarbonas)..... gr. xxij 2 0;
 Glycerini..... ℥vj 23 0;
 Aquæ menthæ piperitæ..... ℥ij 60 0.—M.

Sig.—One-half to one teaspoonful two or three times daily (Squibb).

When fecal impaction is troublesome an occasional oil or soapsuds enema to clear the bowel is indicated.

Enterocolitis and Proctitis.—This condition, which may be acute or chronic, is one of the most frequent and troublesome with which one has to contend in infancy and childhood because the intestinal mucosa is extremely sensitive and when irritated diarrhea ensues. Inflammation of the small intestine and colon responsible for loose movements may be caused by extreme heat, violent exercise, overeating, partaking of contaminated or improperly cooked food, getting wet, exposure to cold, taking irritant medicines to relieve constipation or other ailments, ptomain poisoning, acute contagious and febrile diseases, and infection induced by *Amœba histolytica*, Shiga, Flexner, Harris, and other so-called *dysenteric bacilli*, *Balantidium coli*, and *tubercle bacilli*.

Other organisms—*Proteus vulgaris*, colon bacillus, *Bacillus enteridis*—Gärtner's—sporogenes, streptococci, *B. butyricus*, paratyphoid bacilli, and others of the accidental and obligate pathogenic micro-organisms of the intestinal canal, have also been discovered in the stools of children affected with colitis, but amebic, bacillary, and *Balantidium coli* are seldom responsible for chronic colitis in the states, but are a frequent cause of diarrhea in children living in tropical countries.

Gastrogenic, enterogenic, hepatogenic and neurogenic disturbances, and chemical toxemia, etc., have also been responsible for enterocolitis in infancy and childhood. Acute contagious and febrile diseases of infancy and childhood are also frequently responsible for mild or aggravated diarrhea.

Enterocolitis may be *acute* or *chronic*. In the *acute* type

the *manifestations* are malaise, abdominal discomfort, intestinal fulness and soreness, colicky pains, nausea, diarrhea, and a rise of temperature are in evidence, while in *chronic* enterocolitis *symptoms* are less acute, but diarrhea continues to be the dominant manifestation and abdominal discomfort and distention continue, but to a lesser degree.

Diagnosis may be easy or difficult to make and is based chiefly on the enumerated symptoms and finding of causative organisms in the stools, and ascertaining whether or not the child has been exposed to inclement weather, suffers from ptomain poisoning, or another gastro-intestinal disturbance.

Treatment.—Briefly stated, the treatment of enterocolitis consists in having the patient kept cool, rest in bed, controlling the diet, regulating stools, and irrigating the colon, prescribing non-irritating food that is indicated by a minimum fermentation and putrefaction.

The medical treatment of enterocolitis is largely symptomatic, and consists chiefly in prescribing remedies which will (a) free the bowel of toxins, scybalæ, and other irritating substances; (b) relieve the enterospasm and pain, and (c) diminish the frequency and fluidity of the stools, which include antiseptics, astringents, and opiates in aggravated cases.

Below the author has incorporated a few *emergency* prescriptions that have proved effective in cases of diarrhea due to catarrhal and infectious enterocolitis, dosages being changed in accordance with the patient's age:

Dysenteroid Diarrhea with Mucus and Blood in the Stools and Tenesmus

R̄.	Olei ricini.....	℥ij	0 12;
	Tincturæ opii.....		
	Vinii pecacuanhæ}.....	℥ss	0 03;
	Glycerini.....	℥x	0 60;
	Aquæ cinnamoni.....	q. s. ad. ʒj	4 0.—M.

Sig.—Teaspoonful every four hours.

Infantile Diarrhea with Greenish Stools Accompanied by Abdominal Pain

R̄.	Bismuthi subnitratiss.....	gr. xlv	3 0;
	Liquoris calcis.....	fʒiss	6 0;
	Aquæ fœniculi.....	q. s. ad. ʒij	6 0.—M.

Sig.—Teaspoonful every two hours.

Acute Diarrhea and Dysentery Complicated by Severe Pain and Tenesmus

R̄.	Cocainæ hydrochloratiss.....	gr. j	0 65;
	Extract ergotæ.....	gr. j	0 65;
	Extractum opii.....	gr. iss	0 09;
	Thymolis iodidi.....	gr. iv	0 24;
	Olei theobromatiss.....	gr. cl	6 0.—M.

Fiat suppositoria No. x.

Sig.—One suppository to be used every three hours after preliminary treatment.

R̄.	Extracti hæmatoxyli.....	gr. iss	0|09;
	Tincturæ kramerie.....	℥iiss	0|20;
	Glycerini.....	℥xiij	0|75;
	Aquæ.....	q. s. ad.	℥j

4|0.—M.

Sig.—Teaspoonful three times daily.

R̄.	Phenylis salicylatis.....	gr. iss	0|09;
	Bismuthi subnitratis.....	gr. iv	0|24;
	Pulveris ipecacuanhæ et opii.....	gr. ss	0|03.—M.

Fiat chartulæ No. i.

Sig.—To be given with 10 drops of glycerin three times daily.

High colonic irrigations that cleanse the bowel of irritant feces, discharges, toxins, and *débris* bring immediate relief when employed *warm* twice daily. Of irrigant solutions employed for the purpose the author has found normal saline, boric acid 3, ichthyol 1, and proto-argyrol 5 per cent. the most useful in this class of cases.

Dieting, medication, rest, and irrigation *per anum* occasionally fail to cure chronic ulcerative catarrhal and infectious enterocolitis where the bowel is markedly thickened and extensively ulcerated, leading frequently to toxemia, hemorrhoids, and obstinate diarrhea.

In such cases *appendicostomy*, *cecostomy*, or the author's *ileo-cecostomy*, previously described, are indicated, that the bowel may be kept clean by means of through-and-through colonic irrigation.

Proctitis frequently requires the same treatment as enterocolitis, but quicker and better results are obtained when, in addition, the bowel is sprayed with antiseptic astringent solutions, topical applications are made to ulcers and erosions, and the irritable rectum is occasionally inflated with a powder composed of equal parts of boric acid and zinc stearate.

The author would again remind the reader that the diseases considered in this chapter, as they concern *infants* and *children*, have been more fully discussed elsewhere in these volumes when considering their relation to *adults*.

INDEX TO VOLUMES I, II, III

- ABDOMEN**, wounds and injuries of, ii, 463.
 See also *Wounds of abdominal viscera*.
Abdominal abscess and fecal fistula, diagnostic significance of, ii, 458
 and liver douche in constipation, iii, 202
 distention following anorectal wounds, i, 197
 examination, recumbent position for, i, 71, 73, 86
 excision, mortality of, ii, 356
 local anesthesia, i, 117, 119, 120
 lymph-nodes, enlargement of, diagnostic significance of, ii, 458
 muscles, abnormal, diagnostic significance of, ii, 461
 obstipation in childhood, iii, 459
 operations inoperable under local anesthesia, i, 110
 local anesthesia in, i, 118
 technic, i, 121
 operable under local anesthesia, i, 108
 pain and tenderness in anorectal wounds, i, 197
 perineal proctectomy, indications for, ii, 383
 proctectomy and sigmoidectomy in malignant growths of anorectal region, ii, 423
 roller in atonic constipation, iii, 204
 sensations of uneasiness and fullness, diagnostic significance of, ii, 457
 swellings, diagnostic significance of, ii, 458
 tenderness in malignant growths of anorectal region, ii, 321
Abdomino-anal, abdominoperineal, abdominosacral, and abdominovaginal excision in malignant growths of anorectal region, ii, 416
 excision, combined operation, history and evolution of, ii, 344
 in malignant growths of anorectal region, ii, 344
 excision for malignant growths of anorectal region, ii, 416
- Abdominoperineal and abdominosacral excision**, combined operation, mortality of, ii, 356
 proctectomy, preliminary colostomy in connection with, ii, 418
 advantages of, ii, 416
 disadvantages of, ii, 417
 Gant's technic, ii, 418
 in malignant growths of anorectal region, ii, 416
 two-stage, ii, 421
 where sphincter is preserved, ii, 420
 with colostomy, ii, 422
Abdominosacral excision for malignant growths of anorectal region, ii, 416
Abdominovaginal excision for malignant growths of anorectal region, ii, 416
Abnormal abdominal muscles, diagnostic significance of, ii, 461
 location of anus, i, 133
 sitting or standing posture in diagnosis of anorectal disease, i, 51
Abnormalities and displacements of intestine, congenital and acquired, i, 9
Abscess, abdominal and fecal fistula, diagnostic significance of, ii, 458
 anal fissure and, differentiation, i, 238
 and fistula, chronic, as cause of chronic rectal obstipation, iii, 244
 in anorectal ulceration, ii, 93
 anorectal, i, 279. See also *Anorectal abscesses*.
 Bartholin's gland, i, 308
 cavity, old, diverticulum of upper rectum simulating, ii, 291
 treatment, ii, 291
 complicating diverticulitis of sigmoid flexure, iii, 167
 diffuse septic, i, 311
 diphtheric, i, 308
 following hemorrhoid operation, i, 541
 gangrenous, i, 309
 hepatic, diagnostic significance of, ii, 458

- Abscess, intermural, i, 306
 interstitial, i, 308
 ischiorectal, i, 293. See also *Ischiorectal abscesses*.
 pelvirectal, i, 279, 297. See also *Anorectal abscesses*.
 perianal, i, 279. See also *Anorectal abscesses*.
 periproctitic, i, 279. See also *Anorectal abscesses*.
 perirectal, i, 279. See also *Anorectal abscesses*.
 phlegmonous, i, 309
 retrorectal, i, 301
 submucous, i, 306
 superior pelvirectal, i, 303
 tubercular, i, 307
 multilocular, i, 308
 Absence of anus, entire, i, 135
 of rectum, total, i, 140
 Absorption, ii, 442
 Accelerated transudation of fluid into bowel
 causing nervous diarrhea, iii, 95
 Acetone in urine, i, 64
 Acid poisoning, iii, 84
 urine, i, 64
 Acids, ulceration of intestine from, ii, 467
 Acquired abnormalities and displacements of
 intestine, i, 9
 Actinomycosis, iii, 107
 rectal, iii, 108
 Acupuncture in treatment of internal vari-
 cose hemorrhoids, i, 479
 Addison's disease inducing gastro-intestinal
 disturbances, iii, 90
 Adenocarcinomata, ii, 303, 304
 anorectal, ii, 242
 degree of malignancy of, ii, 304
 development of, ii, 304
 site of, ii, 304
 Adenofibroma, anorectal, ii, 242
 Adenoid cancer, ii, 305, 306
 Adenolymphoma, anorectal, ii, 242
 Adenoma, colonic, ii, 244
 destruens, ii, 305
 malignant, ii, 305
 multiple, of colon and sigmoid flexure, iii,
 320
 of anorectal region, ii, 242, 245
 multiple, ii, 246
 villous, ii, 248
 of colon and sigmoid flexure, iii, 318
 Adenomatosis of colon and sigmoid flexure,
 iii, 320
 Adenomyoma, anorectal, ii, 242
 of vagina and rectovaginal septum, ii, 246
 Adenopathy, ileocecal, in tuberculosis of
 intestine, colon, and sigmoid flexure, iii, 51
 Adhesions and contracting exudates as
 cause of chronic obstipation, iii, 228
 subtegumentary, in pruritus ani, ii, 114
 Adrenalin added to anesthetic solution, i,
 115, 122
 Adults and children, fecal incontinence of, i,
 400. See also *Fecal incontinence*.
 Affections, skin, of perianal region and but-
 tocks, ii, 135
 Agnew's solution for injection treatment of
 internal hemorrhoids, i, 488
 Agoraphobia, diarrhea in, iii, 100
 Air, liquid, anesthesia, i, 114
 Alcoholic diarrhea, iii, 105
 Alimentary canal during fifth week, i, 4
 glands of, development of, i, 8
 primitive, muscular coat of, i, 8
 cells of mesodermic stratum of, i, 8
 entodermic stratum of, i, 8
 layers of, i, 8
 mesodermic stratum of, i, 8
 submucosa of, i, 8
 Allantois, i, 6
 Allingham's operation for procidentia sig-
 moide, ii, 56
 Allison's table, i, 74
 Altered feces in diagnosis of anorectal dis-
 ease, i, 49
 diagnostic significance of, ii, 459
 Alveolar cancer, ii, 310, 311
 Ameba histolytica, ii, 526, 528
 cysts, ii, 527
 Amebiasis, ii, 525
 complications of, ii, 82
 Amebic anorectal stricture, ii, 213
 ulceration, ii, 81
 colitis, ii, 525
 acute, ii, 528
 bacillary colitis and, differential diag-
 nosis, iii, 6
 chronic, ii, 529
 complications, ii, 535
 definition, ii, 525
 diagnosis, ii, 535
 etiology, ii, 525
 fully developed stage, ii, 530

- Amebic colitis, general remarks, ii, 525
 pathology, ii, 527
 preulcerative stage, ii, 550
 prognosis, ii, 536
 symptoms, ii, 532
 treatment, ii, 537
 dietetic, ii, 537
 local, ii, 539
 colonic irrigation in, ii, 539
 fulguration, ii, 543
 irrigants for, ii, 541
 topical applications in, ii, 543
 medicinal, ii, 538
 prophylactic, ii, 537
 supportive, ii, 537
 surgical, ii, 543
 ulcerative stage, ii, 530
 dysentery, ii, 525
 ulcers of colon, ii, 531
 of sigmoid flexure and colon, ii, 536
 American operation, Pratt's, for internal hemorrhoids, i, 519
 Ampulla of rectum, i, 12, 13
 lesions in, i, 14
 mobility of, i, 13
 position, i, 13
 shape, i, 13
 tuberculosis of, ii, 145. See also *Tuberculosis of upper rectum*.
 Amputation and resection in malignant growths of anorectal region, comparative merits of, ii, 348
 Amulets, i, 478
 Amylase, ii, 441
 Amyloidosis, iii, 107
 Anal and partial excision, mortality of, ii, 356
 canal, i, 7, 12
 anatomy of, i, 18
 feces in, i, 15
 lesions in, i, 15
 miliary tubercles in, ii, 79
 narrowing of, as cause of chronic rectal obstipation, iii, 245
 position of, i, 14
 tuberculosis of, ii, 78, 144. See also *Tuberculosis of anal canal*.
 carcinomata, ii, 90
 dilation, i, 82
 dilators, self-retaining, i, 225; ii, 225; iii, 286
 diseases of infancy and childhood, iii, 441
 douche, ascending, Gant's, i, 473
 Anal epitheliomata, ii, 90
 fissure as cause of anorectal abscesses, i, 282
 fistula, definition, i, 313
 membrane, i, 5
 rupture of, i, 7
 papillæ, i, 18
 anesthetization of, i, 210
 hypertrophied, i, 19, 205; iii, 450. See also *Papillitis*.
 pit, i, 6
 proctectomy in malignant growths of anorectal region, ii, 425
 region, neutral zone, lymphatics of, i, 30
 sarcomata, ii, 90
 Anemia, dirt eaters', iii, 23
 pernicious, diarrhea in, iii, 104
 Anemic diarrhea, iii, 104
 Anesthesia, i, 97
 cataphoresis, i, 114
 caudal, i, 103
 solutions for, i, 105
 chloroform, i, 97
 cocain, i, 114
 ether, i, 97
 spray, i, 114
 ethyl chlorid, i, 98, 114
 eucain, i, 114
 advantages of, i, 115
 extradural, i, 103
 for hemorrhoidal operations, i, 494
 for rectal examination, i, 70
 gas-oxygen, i, 97
 general, i, 97
 hemorrhages following, i, 99
 indications for, i, 98
 operations in which preferred, i, 108
 in anorectal fistula operations, i, 343
 infiltration, i, 98, 106
 laughing gas, i, 98
 liquid air, i, 114
 local, i, 106, 113
 abdominal, i, 117, 119, 120
 technic, i, 121
 anorectal and abdominal operations operable under, i, 108, 110
 technic, i, 116
 aposthesine, i, 116
 apparatus for operations under, i, 111
 hemesia, i, 116
 in abdominal operations, i, 118
 in anorectal operative treatment, i, 114

- Anesthesia, local, in anorectal palliative treatment, i, 113
 in treatment of ischiorectal abscesses, i, 299
 quinin and urea hydrochlorid, i, 116
 simplified buttonhole operation, Gant's, for pruritus ani, ii, 131
 sterile water and normal salt solution, i, 116
 nitrous oxid, i, 98
 contraindications, i, 98
 novocain, i, 114
 paravertebral, i, 102
 presacral, i, 106
 rectal, i, 99; iii, 137
 rectocolonic oil-ether, i, 99
 regional, i, 106
 sacral, i, 102, 103
 solutions for, i, 105
 technic, i, 104
 spinal, i, 99
 advantages of, i, 100
 anesthetic agents for, i, 101
 apparatus for, i, 101
 cause of death from, i, 100
 complications of, i, 100
 danger from, i, 100
 technic, i, 101
 stovain, i, 114
 tropacocain, i, 114
 Anesthetic solution, adrenalin added to, i, 115, 122
 epinephrin added to, i, 122
 Anesthetics, local, i, 113
 Anesthetizing abdominal structures for buttonhole incision, method, in Gant's stab-wound appendicostomy, iii, 382
 Angioma of anorectal region, ii, 254
 papillary, in malignant growths of anorectal region, ii, 323
 sacrococcygeal, i, 168
 Angular grooved director, Gant's, i, 358
 Angulations and kinks as cause of chronic obstipation, iii, 229
 Ankylostoma duodenale, iii, 23
 Annular cancer, ii, 307
 Anomalies of anus and rectum, i, 123
 Anorectal abscesses, age incidence in, i, 279
 anterior, i, 284
 classification, i, 286
 direct causes, i, 281
 Anorectal abscesses, diseases of other organs and structures causing, i, 282
 etiology, i, 280
 fistula after, i, 279
 follicular, i, 287, 288
 diagnosis, i, 288
 symptoms, i, 288
 treatment, i, 288
 fulminating, i, 286
 general remarks, i, 279
 in childhood, iii, 451
 infralevator, i, 287
 lateral, i, 284
 pathology, i, 283
 posterior, i, 284
 predisposing causes, i, 281
 prognosis, i, 312
 subcutaneous marginal, i, 290
 diagnosis, i, 291
 symptoms, i, 291
 treatment, i, 293
 superior, i, 303
 supralevator, i, 287
 tegumentary, i, 287
 amputation and resection, method of handling blood-vessels in, ii, 363
 bowel ends in, ii, 372
 lymphatics, ii, 363
 postoperative treatment, ii, 381
 surgical importance of, and method of handling lymphatics, ii, 370
 and other diseases, coexisting relations between, i, 93
 and pulmonary tuberculosis and fistula in ano, relationship between, i, 393
 anomalies, congenital, iii, 444
 cancer in childhood, iii, 455
 chancres, ii, 185
 diagnosis, ii, 186
 mixed infection in, ii, 185
 symptoms, ii, 185
 treatment, ii, 186
 deformities, congenital, i, 123
 classification, i, 126
 Keith's table of, i, 126
 postoperative treatment, i, 151
 prognosis, i, 151
 synopsis of 8 cases treated by Gant, i, 127
 diseases as cause of disturbances and diseases in other regions, i, 96

- Anorectal diseases causing anorectal hemorrhage, ii, 3
- diagnostic significance of manifestations pointing to, i, 44
- manifestations and signs of, i, 45
- of infancy and childhood, treatment of, general remarks on, iii, 444
- operative treatment, anesthesia in, i, 114
- palliative treatment, anesthesia in, i, 113
- resulting from pederasty, ii, 205
- diverticula, ii, 286
- diagnosis, ii, 288
- etiology, ii, 287
- Gant's method of excising, ii, 290
- 9 cases of, ii, 286
- pathology, ii, 288
- symptoms, ii, 288
- treatment, ii, 289
- excision and resection, history and evolution of, ii, 342
- fistula, i, 313
- age in, i, 314
- Beck's bismuth paste in, i, 336
- bleeding complicating operation, i, 370
- blind external, i, 318
- internal, 318
- cicatricial tissue complicating operation, i, 371
- classification, i, 316
- complete, i, 316
- complex, i, 317
- external, i, 322
- internal, i, 320
- simple, i, 317
- complex, i, 324
- complicated, i, 324
- complications during and following operations for, i, 370
- definition, i, 313
- diagnosis, i, 327
- electricity in, i, 335
- electrochemical agents in, i, 335
- etiopathology, i, 315
- fecal incontinence sequela of operation, i, 372
- historic note, i, 313
- horseshoe, i, 322
- in childhood, iii, 452
- operations, classification of, i, 339
- preparation of patient for, i, 339
- ordinary types, i, 316
- Anorectal fistula, postoperative pain and sensitiveness, i, 371
- treatment, i, 367
- prognosis, i, 330
- pulmonary and anorectal tuberculosis, relationship between, i, 393
- retention of urine complicating operation, i, 371
- sepsis complicating operation, i, 370
- sex in, i, 314
- shock complicating operation, i, 370
- special types, i, 316, 373
- stricture of anus, sequela of operation, i, 372
- symptoms, i, 325
- treatment, i, 332
- non-operative, i, 332, 334
- postoperative, i, 367
- prophylactic, i, 332, 333
- surgical, i, 338
- anesthesia in, i, 343
- disadvantages of excision operation, i, 361
- division with Paquelin cautery in, i, 357
- divulsion of sphincter in, i, 357
- excision operation, i, 360, 361
- Elting's method, i, 365
- MacKenzie's method, i, 365
- postoperative treatment, i, 364
- preparation of patient for, i, 361
- with immediate approximation of wound edges and sphincteric ends, technic, i, 361
- fistulectomy, i, 360
- general remarks, i, 338
- incising blind internal, i, 358
- incision of sphincter in, i, 348
- operation in, i, 346
- instruments for, i, 341
- ligature operation, i, 365
- Gant's technic, i, 366
- multiple openings, i, 349, 350
- position for, i, 341
- postoperative infection, i, 347
- preparation of patient for, i, 339
- séton operation, i, 367
- severing sphincter in, i, 358
- technic of division in complete, i, 353
- varieties, i, 316

- Anorectal fistula, why fistula operations are unsuccessful, i, 338**
 hemorrhage, anorectal diseases causing, ii, 3
 cancer of anus and rectum causing, ii, 4
 capillary varicosities causing, ii, 4
 color of blood in, ii, 1
 condylomata causing, ii, 5
 constipation and fecal impaction causing, ii, 4
 cryptitis causing, ii, 5
 diagnosis, ii, 9
 diverticula causing, ii, 6
 external, ii, 1
 fissure in ano causing, ii, 4
 fistula as cause, ii, 5
 foreign bodies causing, ii, 2
 general remarks, ii, 1
 hemorrhagic proctitis causing, ii, 4
 idiopathic, operative and postoperative, reliable methods of arresting, ii, 12
 injuries in, ii, 3
 internal, ii, 1
 hemorrhoids causing, ii, 3
 invagination of sigmoid flexure into rectum causing, ii, 6
 invisible, ii, 1
 miscellaneous diseases causing, ii, 6
 operative and postoperative causes of, ii, 6
 late, ii, 2
 primary, ii, 2
 recurrent, ii, 2
 secondary, ii, 2
 pathology, ii, 2
 polyps causing, ii, 4
 procidentia recti causing, ii, 5
 proctitis, catarrhal, causing, ii, 3
 symptoms, ii, 8
 treatment, ii, 10
 cauterization of raw surfaces, ii, 20
 clamping tissues or vessels with pressure forceps, ii, 18, 19
 distending rectum with rubber or cloth inflatable bag, ii, 17, 19
 following control of, ii, 21
 introducing drainage-tube wrapped in stypticized gauze, ii, 20
 ligation of bleeding vessels, ii, 15
 method of packing rectum with stypticized gauze for, ii, 11
 miscellaneous methods, ii, 21
- Anorectal hemorrhage, treatment, packing wound, anal canal, or rectum, ii, 15**
 placing Gant pyramidal compress over anus, ii, 14
 pyramidal-shaped compress for arresting, ii, 12
 suturing bleeding areas, ii, 17
 torsion of veins and arteries, ii, 20
 Wale's bougie and gauze handkerchief for, ii, 15, 16
 ulceration of rectum causing, ii, 4
 villous tumors causing, ii, 6
 visible, ii, 1
- hemorrhoids, procidentia recti and, differential diagnosis, ii, 31, 32**
 knife, i, 247
 obstipation in childhood, iii, 458
 operations inoperable under local anesthesia, i, 110
 local anesthesia for, technic, i, 116
 operable under local anesthesia, i, 108
 posture for, i, 111
 under infiltration anesthesia, apparatus for, i, 111
- phlegmon, ii, 66**
 region, arteries of, i, 24
 birth-marks of, ii, 255
 furuncles of, i, 287, 288
 gas, fecal, and mucous cysts of, ii, 279
 case histories, ii, 281-285
 diagnosis, ii, 280
 symptoms, ii, 280
 treatment, ii, 281
- lymphatics of, i, 29**
 surgical importance of, i, 32
 malignant growths of, ii, 293
 abdominal tenderness and chronic peritonitis in, ii, 321
 age in, ii, 297
 cancer, ii, 303
 black, ii, 312
 colloid, ii, 310
 encephaloid, ii, 309
 gelatinoid, ii, 310
 horny, ii, 303
 in childhood, iii, 455
 medullary, ii, 309
 melanotic, ii, 312
 operability of, ii, 352
 ossifying, ii, 312
 scirrhous, ii, 309
 classification, ii, 299

Anorectal region, malignant growths of, constipation in, ii, 320
 constitutional symptoms, ii, 323
 diagnosis, ii, 324
 differential, ii, 328
 digital examination in, ii, 325
 microscopic examination in, ii, 327
 palpation in, ii, 325
 proctoscopic examination in, ii, 327
 x-ray examination in, ii, 327
 diarrhea in, ii, 320
 diet in, ii, 299
 discharge of, ii, 321
 epithelioma, ii, 300
 etiology, ii, 295
 fecal impaction in, ii, 320
 incontinence in, ii, 323
 general remarks, ii, 293
 hemorrhage in, ii, 321
 hereditary tendency in, ii, 296
 irritation and trauma in, ii, 296
 locality, ii, 298
 lymphosarcomata, ii, 318
 malformed stools in, ii, 321
 menstrual, urethral, prostatic, and vesical disturbances in, ii, 322
 metastasis in, ii, 323
 mortality from rectal extirpation, ii, 353
 of abdominal excision, ii, 356
 of abdominoperineal and abdominosacral excision, combined operation, ii, 356
 of anal and partial excision, ii, 356
 of excision operations, ii, 354
 of perineal excision, ii, 355
 of sacral excision, Kraske's operation, ii, 355
 of vaginal excision, ii, 355
 obstruction in, ii, 322
 occupation in, ii, 298
 odor in, ii, 321
 operative complications and sequelæ, ii, 358
 pain in, ii, 320
 papillary angiomata in, ii, 323
 pathology, ii, 300
 perforation in, ii, 322
 position of patient for examination, ii, 325

Anorectal region, malignant growths of, post-operative complications and sequelæ, ii, 359
 preparation of patient for examination, ii, 325
 procidentia ani in, ii, 323
 prognosis, ii, 357
 race in, ii, 298
 recurrence in, ii, 357
 remote complications and sequelæ, ii, 360
 sarcoma, ii, 313
 classification and description, ii, 314
 frequency of, in different decades, ii, 313
 location of, ii, 313
 medullare, ii, 314
 melanotic, ii, 318
 symptoms, ii, 323
 true mixed forms, ii, 316
 sex in, ii, 298
 sphincteralgia in, ii, 322
 straining in, ii, 320
 symptoms, ii, 319
 tenesmus in, ii, 320
 treatment, cauterization in, ii, 334
 colostomy, ii, 335
 curettage in, ii, 334
 diathermy in, ii, 340, 425
 forcible divulsion in, ii, 334
 miscellaneous remedies, ii, 340
 non-surgical curative, ii, 337
 non-operative, ii, 330
 palliative, ii, 330
 alleviating obstruction, ii, 333
 electricity in, ii, 333
 handling complications, ii, 333
 improving general condition in, ii, 331
 inflamed and ulcerated bowel, ii, 333
 procuring comfortable evacuations, ii, 331
 regulating diet in, ii, 331
 relief of suffering and insomnia, ii, 332
 Percy's slow-cooking procedure, ii, 339
 postoperative, following anorectal extirpation, ii, 381
 proctotomy in, ii, 335

- Anorectal region, malignant growths of, treatment, radiotherapy in, ii, 337
 roentgenotherapy in, ii, 338
 surgical, ii, 342
 abdominal proctectomy and sigmoidectomy in, ii, 423
 abdomino-anal, abdominoperineal, abdominosacral, and abdominovaginal excision, ii, 416
 excision, combined operation in, ii, 344
 abdominopercineal proctectomy, ii, 416
 advantages of combined over perineal and sacral proctectomy, ii, 368
 of isolating, ligating, and severing blood-vessels in, ii, 363
 choice of operation, ii, 347
 classification of operations, ii, 350
 coloproctostomy in, ii, 344
 combined operation in, advantages of, ii, 416
 disadvantages of, ii, 417
 comparative merits of amputation and resection, ii, 348
 contraindications to excision and resection, ii, 346
 copious bleeding during, prevention of, ii, 369
 danger zone of rectum in, ii, 365, 366
 Gant's technic of inferior proctectomy when sphincter is preserved, ii, 392
 is sacrificed, ii, 384
 coccyx and section of sacrum are removed, ii, 398
 osteo-integumentary flap is formed, ii, 404
 general remarks, ii, 346
 history and evolution of, ii, 342
 importance of, and methods of dealing with lymphatics, ii, 370
- Anorectal region, malignant growths of, treatment, surgical, inferior mesenteric artery in, ii, 366
 proctectomy in, ii, 383
 with preservation of sphincter, ii, 391
 ligation and division of middle sacral artery, ii, 369
 method of handling blood-vessels in, ii, 363
 bowel ends in sigmoidal and rectal extirpation, ii, 372
 when colostomy is performed, ii, 373
 when sphincter is preserved, ii, 378
 is sacrificed, ii, 377
 osteo-integumentary flap operation in, ii, 343
 palliative, ii, 334
 partial proctectomy, ii, 424
 perineal excision, Lisfranc's operation, ii, 342
 position of patient for, ii, 350
 posterior proctectomy in, ii, 397
 postoperative treatment after anorectal extirpation, ii, 381
 preliminary colostomy in, ii, 350, 353
 in connection with combined operation, ii, 418
 preparation of patient, ii, 349
 resection with hysterectomy in, ii, 344
 sacral excision, Kraske's operation, ii, 342
 special technic of other operators, ii, 345
 two-stage abdominoperineal proctectomy, ii, 421
 proctectomy, Gant's, ii, 404
 vaginal excision in, ii, 343
 proctectomy in, Gant's technic, ii, 408
 tympanites in, ii, 321
 weight and fulness in rectum, ii, 320
 manifestations and diseases of, induced by extrarectal causes, i, 93
 muscles of, i, 33
 nerves of, i, 29
 non-malignant growths of, ii, 238

- Anorectal region, non-malignant growths of,
 adenoma, ii, 242, 245
 angioma, ii, 254
 classification, ii, 239
 condylomas, ii, 250
 cysts, ii, 260
 retention, ii, 261
 dermoid cysts, ii, 262
 diagnosis, ii, 266
 enchondroma, ii, 257
 etiology and pathology, ii, 240
 excision, ii, 276
 fibroma, ii, 251
 gumma, ii, 259
 hypertrophied papilla, ii, 259
 inflammatory tumors, ii, 257
 keloids, ii, 251
 lipoma, ii, 253
 lymphadenoma, ii, 257
 multiple adenomas, ii, 246
 myoma, ii, 254, 257
 neoplastic tubercular tumor, ii, 258
 osteoma, ii, 257
 papillomas, ii, 250
 mucous, ii, 250
 rectocolonic, ii, 250
 parasitic tumor, ii, 260
 polyps, ii, 240
 postanal dimples, ii, 264
 sacroccygeal tumors, ii, 264
 symptoms, ii, 264
 treatment, ii, 268
 appendicostomy or cecostomy, ii, 278
 clamp and cautery operation, ii, 276
 operation, ii, 270
 colostomy in, 279
 fulguration for, ii, 274
 ileostomy or short-circuiting, ii, 278
 ligature operation, ii, 273
 other operative measures, ii, 277
 villous adenomata, ii, 248
 tumors of, ii, 248
 superficial nerves of, i, 29
 veins of, i, 27
 stenosis, ii, 207. See also *Anorectal stricture*.
 stricture, classification, ii, 208
 congenital, ii, 208
 diagnosis, ii, 220
 Anorectal stricture, etiology, ii, 207
 extrarectal, ii, 217
 general remarks, ii, 207
 hemorrhoidal, ii, 217
 inflammatory, ii, 213
 amebic, ii, 213
 bacillary, ii, 213
 balantidic, ii, 213
 catarrhal, ii, 210
 diphtheric, ii, 214
 tubercular, ii, 211
 miscellaneous, ii, 218
 neoplastic, ii, 218
 pathology, ii, 218
 phantom, ii, 208
 prognosis, ii, 222
 spasmodic, ii, 208
 symptoms, ii, 219
 traumatic, ii, 209
 causes, ii, 210
 treatment, ii, 224
 colostomy in, ii, 235
 conservative, ii, 224
 diaphragmatic and membranous partitions, elimination of, ii, 234
 electrolysis in, ii, 227
 excision in, ii, 231
 external proctotomy in, ii, 230
 forcible divulsion in, ii, 229
 Gant's valve clamp proctotomy in, ii, 234
 gradual dilatation in, ii, 227
 internal proctotomy in, ii, 229
 proctoplasty in, ii, 233
 rectosigmoidostomy in, ii, 234
 surgical, ii, 228
 tubercular, fibrosclerotic, ii, 213
 hyperplastic, ii, 211
 valvular, ii, 217
 varieties, ii, 207
 venereal, ii, 214
 chancroidal, ii, 214
 congenital luetic fissures, ii, 217
 gonorrheal, ii, 214
 gummatous deposits, ii, 217
 proctitis syphilitica, ii, 216
 syphilitic, ii, 215
 structures, sloughing of, following hemorrhoid operations, i, 542
 syphiloma, ii, 196
 tuberculosis, ii, 144; iii, 53. See also *Tuberculosis, anorectal*.

- Anorectal tumors. See *Anorectal region, malignant growths of. Anorectal region, non-malignant growths of.*
- ulceration, ii, 58
- abscess and fistula in, ii, 93
- amebic, ii, 81
- symptoms, ii, 83
- treatment, ii, 83
- bacillary, ii, 85
- symptoms, ii, 86
- treatment, ii, 87
- balantidic, ii, 87
- cancerous, ii, 90
- catarrhal, ii, 69
- common types of, ii, 69
- constipation in, 92
- cutaneous, ii, 61
- diagnosis, ii, 93
- diarrhea in, ii, 92
- diphtheric, ii, 65
- discharge in, ii, 91
- diseases by which complicated, ii, 61
- dysenteric, ii, 81, 85
- etiology, ii, 58
- excoriation in, ii, 91
- feeling of weight and fulness in, ii, 92
- fibrosclerotic, ii, 77
- follicular, ii, 71
- gangrenous, ii, 66
- general remarks, ii, 58
- helminthic, ii, 88
- hemorrhage in, ii, 92
- hemorrhoidal, ii, 71
- hyperplastic tubercular, ii, 76
- in childhood, iii, 446
- insufflation in, ii, 98
- lupoid, ii, 80
- occasional types, ii, 61
- pain in, ii, 91
- perforation and peritonitis in, ii, 93
- phagedenic, ii, 65
- pruritus ani in, ii, 91
- rare types, ii, 60
- rodent, ii, 63
- anal epitheliomatous ulceration and, differentiation, ii, 64
- sphincteralgia in, ii, 91
- sphincteric spasm complicating, ii, 102
- stenosing, ii, 77
- strictural, ii, 89
- symptoms, ii, 90
- constitutional, ii, 90
- Anorectal ulceration, symptoms, local, ii, 90
- tencismus in, ii, 92
- traumatic, ii, 73
- treatment, ii, 95
- cauterants in, ii, 100
- cauterization in, ii, 101
- conservative, ii, 96
- constitutional, ii, 95
- fulguration in, ii, 101
- Gant's method of freeing mucosa of
- anal canal and excising chronic ulcers, ii, 104
- irrigation in, ii, 97
- local, ii, 96
- medicated tampons in, ii, 102
- oil injection in, ii, 98
- spraying in, ii, 98
- styptic agents in, ii, 100
- suppositories in, ii, 101
- surgical, ii, 102
- topical applications in, ii, 99
- tubercular, ii, 74
- atrophic, ii, 77
- varicose, ii, 62
- treatment, ii, 63
- venereal, ii, 88
- verruccose, ii, 68
- wounds and injuries, i, 191
- author's cases, i, 200
- comments on, i, 203
- complications, i, 197
- contused, i, 191
- diagnosis, i, 197
- etiology and classification, i, 191
- incised, i, 194
- lacerated, i, 191
- miscellaneous, i, 195
- penetrating, i, 194
- perforating, i, 194
- pneumatic, i, 194
- puncture, i, 194
- symptoms, i, 196
- treatment, i, 198
- types, i, 191
- as cause of sphincteralgia, i, 222
- Anoscopes, Gant's, i, 75, 77
- in examination of anal canal, i, 89
- self-retaining, i, 89
- Anoscopic examination, i, 85
- technic, i, 86
- Anovulvar chancroids, ii, 181
- elephantiasis, ii, 142

- Anovulvar epithelioma, perianal lupus and,
 differential diagnosis, ii, 170
 ulcerative elephantiasis, ii, 172
 diagnosis, ii, 176
 etiopathology, ii, 173
 general remarks, ii, 172
 perianal lupus and, differential diagnosis, ii, 170
 symptoms, ii, 175
 treatment, local, ii, 176
 operative, ii, 178
- Anterior rectocele, diverticulum with uterine
 procidentia simulating fecal cyst, ii, 285
 spina bifida, i, 156
- Anthrax diarrhea, iii, 115
- Antiperistaltic waves of large intestine, ii, 445
- Anus, abnormal location of, i, 133
 absence of, entire, i, 135
 and rectum, hemorrhage from, ii, 1. See
 also *Anorectal hemorrhage*.
 narrowing of, local anesthesia operation
 for, i, 130
 partial occlusion of, by membranes or
 fibrous bands, i, 131
 union between, development of, i, 7
 anomalies of, i, 123
 artificial, controllable, for inoperable luetic
 stricture of rectum, ii, 236
 definition, iii, 433
 in rectovesical fistula, i, 380
 blood-supply of, i, 24
 chancre of, ii, 185
 chancroids of, ii, 181
 covering of, i, 22
 development of, i, 5
 examination of, i, 69
 and diagnosis of, i, 54
 fissure of, i, 227. See also *Fissure in ano*.
 fistula in, pulmonary and anorectal tubercu-
 losis, relationship between, i, 393
 funnel-shaped, i, 38; ii, 202
 gonorrhea of, ii, 179
 hypertrichosis of, ii, 139
 imperforate, i, 7, 128
 mortality from different operations for,
 i, 153
 rectum opening into bladder, i, 146
 into urethra, i, 147, 148
 into uterus, i, 148
 into vagina, i, 144
 on surface, i, 150
 through glans penis, i, 147
- Anus, imperforate, rectum terminating at
 sacral end, coccyx congenitally absent,
 i, 134, 149
 where rectum ended in blind pouch,
 operation for, i, 138, 139
 terminates at perineoscrotal junc-
 ture, operation for, i, 135-137
 infundibuliform, in anal fissure, i, 233
 inguinal, in rectovesical fistula, i, 381
 itching at, ii, 105. See also *Pruritus ani*.
 lifter of, i, 35
 lymphatics of, i, 29
 malformations of, i, 123, 128
 malignant growths of, ii, 293. See also
Anorectal region, malignant growths of.
 muscles of, i, 33
 narrowing of, i, 129
 nerve supply of, i, 29
 non-malignant growths of, ii, 238. See
 also *Anorectal region, non-malignant
 growths of*.
 normal, i, 23
 or absent with rectum opening into
 another organ, i, 142
 occlusion of, complete membranous, i, 132
 patulous, i, 23, 408
 following hemorrhoid operations, i, 526
 prolapse of, ii, 22. See also *Procidentia ani*,
recti, and *sigmoidæ*.
 size, i, 23
 stricture of, following fistula operation, i,
 372
 structure of, i, 22
 syphilis of, ii, 184
 tightly contracted, i, 23
 tumors of. See *Anorectal region, malignant
 and non-malignant growths of*.
 venereal diseases of, ii, 179
 vitiligo of, ii, 136, 137
 with termination of rectum at short or
 considerable distance above, i, 140
 wounds of, i, 191
- Aposthesine as local anesthetic, i, 116
- Apparatus, irrigating, for catarrhal entero-
 colitis, ii, 522
- Appendages, caudal, i, 168
- Appendectomy, McBurney's method, iii, 146
 in appendicitis, iii, 145
- Appendical and cecal openings, closure of,
 iii, 388
 infections as cause of anorectal diseases, i,

- Appendices epiploicæ, ii, 434
 Appendicitis, ii, 515; iii, 141
 appendectomy in, iii, 145
 blood in, i, 65
 diagnosis, ii, 519; iii, 143
 etiology, iii, 142
 McBurney's operation in, iii, 146
 pathology, iii, 142
 surgical treatment, iii, 145
 symptoms, iii, 142
 treatment, iii, 144
 Appendicocœcostomy, iii, 387
 general remarks, iii, 366
 history, iii, 365
 in tuberculosis of intestines, iii, 66
 Appendico-enterostomy, iii, 387
 general remarks, iii, 366
 history, iii, 365
 Appendicostomy, advantages of, iii, 370
 cœcostomy and, comparative advantages of,
 iii, 369
 disadvantages of, iii, 370
 Gant's, iii, 380
 general remarks, iii, 366
 history, iii, 365
 where his irrigator is employed, iii, 383
 in malignant growths of colon and sigmoid
 flexure, iii, 342
 in non-malignant growths of anorectal
 region, ii, 278
 in tuberculosis of intestines, iii, 66
 indications for, iii, 367
 mortality, iii, 370
 or cœcostomy and through-and-through
 irrigation in tuberculosis of intestines,
 iii, 67
 simple stab-wound, Gant's, iii, 381
 Appendix, anesthetizing and excising under
 local anesthesia, i, 121
 Meckel's, iii, 155
 tuberculosis of, iii, 53
 Applicators, i, 79, 81
 ointment, i, 217, 243
 rectocolonic, Gant's, ii, 224
 Argyria, iii, 86
 Arsenic-poisoning, iii, 84
 Arteries of anorectal region, i, 24
 Arteriosclerosis, diarrhea in, iii, 106
 Artery forceps, i, 342
 ilocolic, ii, 436
 inferior mesenteric, ii, 436
 left colic, ii, 437
 middle colic, ii, 436
 right colic, ii, 436
 sigmoid, ii, 438
 superior hemorrhoidal, ii, 436
 Arthritis, relation of focal infection of colon,
 sigmoid flexure, and rectum to, iii, 117
 Artificial anus, controllable, for inoperable
 luctic stricture of rectum, ii, 236
 closure of, iii, 434
 Gant's clamp operation for, iii, 434
 resection with anastomosis, iii, 437
 definition, iii, 433
 fecal fistula and, points of differentiation,
 iii, 433
 in rectovesical fistula, i, 380
 Ascariasis, iii, 25
 diagnosis, 27
 symptoms, 26
 treatment, 28
 Ascarides lumbricoides as cause of pruritus
 ani, ii, 108
 Ascaris lumbricoides, iii, 26
 Ascending colon, i, 3; ii, 431
 Aspiration in superior pelvicorectal abscess, i,
 305
 Asylum dysentery, iii, 1
 Ataxic crises, rectocolonic, iii, 138
 rectum, iii, 138
 Atonic constipation, chronic, iii, 179. See
 also *Constipation, chronic atonic*.
 in childhood, iii, 460
 Atresia ani, i, 128
 types of, i, 128
 urethralis, i, 147
 uterinæ, i, 148
 vaginalis, i, 144
 vesicalis, i, 146
 of colon and sigmoid flexure, ii, 506
 recti, i, 139
 Atrophic catarrhal proctitis, i, 266
 colitis, ii, 517
 stenosing tuberculosis, ii, 150
 tubercular anorectal ulceration, ii, 77
 Auerbach's plexus, i, 29; ii, 438
 Auscultation, i, 61
 Auto-intoxication, ii, 443; iii, 219, 221
 definition, iii, 173
 general remarks, iii, 173
 intestinal, causing frequency of evacuation,
 iii, 96
 diagnostic significance of, ii, 456
 Avenoliths, ii, 497

- BABY** enema syringe, hard-rubber piston, iii, 197
- Bacillary** anorectal stricture, ii, 213
- colitis, iii, 1
- amebic colitis and, differential diagnosis, iii, 6
 - catarrhal, iii, 3
 - diagnosis, iii, 6
 - etiology of, iii, 4
 - etiopathology, iii, 1
 - pseudodiphtheric membranes, iii, 4
 - symptoms, iii, 5
 - treatment, iii, 8
 - irrigating and local, iii, 11
 - medicinal, iii, 8
 - prophylactic, iii, 8
 - serum and vaccine, iii, 9
 - supportive, iii, 8
 - surgical, iii, 12
 - symptomatic, iii, 8
 - topical applications, iii, 12
 - ulcerative, iii, 3
- coloproctitis, ii, 85
- dysenteric colitis, iii, 5
- dysenteroid colitis, iii, 5
- dysentery, iii, 1. See also *Bacillary colitis*.
- ulceration, anorectal, ii, 85
- Bacillus** bulgaricus, introducing into infected colon for changing intestinal flora, iii, 392
- Metchnikoff's, in ileocecal valve incompetence, iii, 266
- Ducrey's, ii, 181, 199
- dysenteriae, chief differentiating characteristics of, Mason's table of, iii, 7
- pseudodysenteric, iii, 115
- pyocyaneus, iii, 5
- Shiga, ii, 85, 527
- tuberculosis, iii, 43
- Backache**, i, 183
- diagnosis, i, 186
- etiology, i, 183
- symptoms, i, 185
- treatment, i, 186
- Bag**, inflatable, Gant's, ii, 392
- water-tight tractor, Gant's, ii, 402
- Balantidia coli**, ii, 87
- Balantidic** anorectal stricture, ii, 213
- colitis, iii, 14, 15
- diagnosis, iii, 18
 - histopathology, iii, 16
 - symptoms, iii, 16
- Balantidic colitis, treatment, iii, 18
- rectocolonic ulceration, ii, 87
- Balantidium coli**, iii, 15
- minuteum, iii, 15
- Balfour-Mayo-Coffey** technic in abdominoperineal proctectomy, ii, 422
- Balfour's** technic of rectal extirpation, ii, 345
- Ball-Kyger** method of diminishing wound in hemorrhoid operation, i, 513
- Ball's** operation for pruritus ani, ii, 129
- technic in sigmoidopexy, iii, 263
- Ballooning** of rectum in diagnosis of anorectal diseases, i, 51
- Bartholin's** gland abscess, i, 282, 287, 308
- fistula, i, 388
- Baths**, colonic oxygen, in atonic constipation, iii, 209, 212
- sitz-, for atonic constipation, iii, 200
- Bauhin's** valve, ii, 429
- Beck's** bismuth paste in treatment of anorectal fistula, i, 336
- Beef** tapeworm, iii, 20
- Benign** and malignant neoplasms as cause of chronic obstipation, iii, 236
- growths of anorectal region, ii, 238. See also *Anorectal region, non-malignant growths of*.
- of colon and sigmoid flexure, iii, 317
- Beta-eucain** as local anesthetic, i, 107
- Beverages**, cold, and drinking-water, diarrhea from, iii, 101
- Bezoars**, ii, 496
- Bichio**, ii, 68
- Bifurcated** rectum, ii, 287
- Bilateral** intestinal exclusion, iii, 429
- ischiorectal abscesses, i, 294
- Bilharzia** hematobia, iii, 35
- Bilharziasis**, symptoms, iii, 36
- Biliary** calculi, ii, 496
- Binder** employed by Gant in treatment of colonic ptosis and enteroptosis, iii, 255
- Rose plaster, pattern for, iii, 257
- Birth-marks** of anorectal region, ii, 255
- Bismuth** paste, Beck's, in treatment of anorectal fistula, i, 336
- for defining tracts and diverticula in anorectal fistula operations, i, 348
- Black** cancer, ii, 312
- death, iii, 115
- Bladder**, i, 6
- rectum opening into, in imperforate anus, i, 146

- Blastomycosis of buttocks, ii, 135
- Blazek twins, last illness of, iii, 444
- Bleeding, colonic, blood-picture in, i, 65
- Blind external anorectal fistula, i, 318
 fistula, i, 295
 internal anorectal fistula, i, 318
 fistula, i, 295
- Block method of resecting sigmoid flexure, iii, 364
- Blocking, bowel, sensation of, diagnostic significance of, ii, 461
 nerve, i, 106
- Blood changes, diagnostic significance of, ii, 460
 discharge of, diagnostic significance of, ii, 457
 examination of, i, 55, 64
 in stools, significance of, iii, 123
- Blood-pressure in diagnosis, i, 55
- Blood-supply of colon and sigmoid flexure, ii, 436
 of rectum, i, 24
- Blood-vessels, method of handling, in anorectal amputation and resection, ii, 363
 of colon and sigmoid flexure, ii, 365
 of upper rectum, ii, 365
- Blue gums, iii, 86
- Boils, ii, 140
- Bone diseases inducing enterocolonic disturbances, iii, 91
- Bone-flap operation, Rhen-Rydgier's, ii, 343
- Borborygmi, iii, 137
- Bothrioccephalus latus, iii, 20
- Botulism, iii, 82
- Bougie, Wales', and gauze handkerchief for arresting anorectal hemorrhage, ii, 15, 16
 method of introducing, ii, 226
 soft-rubber, ii, 225
- Bougies, i, 82
- Bovine tubercle bacilli, iii, 43
- Bowel, appearance of, in Hirschsprung's disease, iii, 295
 blocking, sensation of, diagnostic significance of, ii, 461
 ends, methods of handling, in colostomy, ii, 373
 two-stage operation for, ii, 375
 in sigmoidal and rectal extirpation, ii, 372
 when sphincter is preserved, ii, 378
 when sphincter is sacrificed, ii, 377
- Bowel, full and empty, examination of, i, 55
 normal, and other organs, connection between, i, 149
 syphilis of, ii, 184
- Brain and spinal cord diseases inducing enterocolonic disturbances, iii, 91
 injuries as cause of sphincteralgia, i, 222
- Braune's classification of sacrococcygeal tumors, i, 168
- Brinkerhoff's slide speculum, i, 76
 solution for injection treatment of internal hemorrhoids, i, 488
- Bronzed diabetes, iii, 86
- Brunner, glands of, i, 9
- Burning in rectum in diagnosis of anorectal diseases, i, 50
- Burns, diarrhea from, iii, 100
- Bursæ, omental, i, 5
- Buttocks and perianal region, skin affections of, ii, 135
 blastomycosis of, ii, 135
 corns on, ii, 263
 examination and diagnosis of, i, 54
 excoriation of, postoperative, i, 540
- Buttonhole operation for pruritus ani under local anesthesia, i, 110
 Gant's simplified, ii, 131
- CACHECTIC diarrhea, iii, 104
- Cachexia, diagnostic significance of, ii, 460
 in diagnosis of anorectal diseases, i, 52
- Calculi, biliary, ii, 496
 fecal, ii, 500
 intestinal, ii, 494, 498. See also *Intestinal calculi*.
 pancreatic, ii, 500
 prostatic, ii, 500
 urinary, ii, 500
- Canal, anal, i, 7, 12, 14
 dry, spinal anesthesia in, i, 102
 neurenteric, i, 1
- Cancer, adenoid, ii, 305, 306
 alveolar, ii, 310, 311
 anal, ii, 90
 fissure and, differentiation, i, 238
 annular, ii, 307
 black, ii, 312
 blood in, i, 64
 colloid, ii, 310
 encephaloid, ii, 309
 epithelial, types of, ii, 299

- Cancer, fibrous, ii, 309
gelatinoid, ii, 310
hard, ii, 309
horny, ii, 303
houses, ii, 298
ileocecocolic hyperplastic tuberculosis and,
Gant's differential diagnosis, iii, 61
juice, ii, 306
medullary, ii, 309
melanotic, ii, 312
milk, ii, 309
of anorectal region, ii, 293. See also *Anorectal region, malignant growths of*.
of colon and sigmoid flexure, iii, 333. See also *Colon and sigmoid flexure, malignant growths of*.
of large intestine and rectum, fecal impaction and, differential diagnosis, iii, 308
of rectum and other organs, Williams' table of relative frequency of, ii, 293
ossifying, ii, 312
protuberant, ii, 307
rectal, as contraindication to hemorrhoidal operation, i, 493
sacrococcygeal, i, 168
sarcomatodes, ii, 316
scirrhus, ii, 309
soft, ii, 309
teleangiectodes, ii, 309
tubular, ii, 307
- Cancerous ulceration, anorectal, ii, 90
- Capillary varicosities causing anorectal hemorrhoids, ii, 4
- Caput coli, anatomy of, ii, 427
- Carbolic acid solutions for injection treatment of internal hemorrhoids, i, 482, 488
- Carcinoma. See *Cancer*.
- Carcinomatous grafting in tuberculosis of colon, intestine, and sigmoid flexure, iii, 54
- Cataphoresis anesthesia, i, 114
- Catarrhal anorectal stricture, ii, 210
ulceration, ii, 69
bacillary colitis, iii, 3
enterocolitis, ii, 515
as cause of anorectal diseases, i, 95
definition, ii, 515
diagnosis, ii, 518
etiopathology, ii, 515
Gant's ileocecostomy in, ii, 524
general remarks, ii, 515
irrigating apparatus for, ii, 522
treatment, ii, 521
- Catarrhal enterocolitis, opotherapy in, ii, 523
organotherapy in, ii, 523
pathology, ii, 516
prognosis, ii, 524
surgical treatment, ii, 523
symptoms, ii, 518
treatment, ii, 520
- proctitis, i, 260, 261
acute, i, 261
diagnosis, i, 262
in adults, causes, i, 261
in young, causes, i, 261
mucous membrane in, i, 261
surgical interference, i, 264
symptoms, i, 262
treatment, i, 262
- causing anorectal hemorrhage, ii, 3
- chronic, i, 264
atrophic, i, 266
colectomy in, i, 276
colonic exclusion in, i, 276
colostomy in, i, 276
diagnosis, i, 271
fulguration in, i, 275
hypertrophic, 266
infection with, i, 268, 269
mucous channels complicating, i, 269
pathology, i, 266
proctectomy in, i, 276
prognosis, i, 271
stricture complicating, i, 268
surgical treatment, i, 275
symptoms, i, 270
treatment, i, 272
- etiology, i, 264
locality where most prevalent, i, 261
- Catgut, i, 343
- Cathartics, diarrhea from, iii, 99
- Catheter, method of closing and retaining in appendix or cecum, iii, 381
of preventing slipping into or out of cecum, iii, 381
of retaining and closing with adhesive strips and ligature, Gant's, iii, 381
retaining in position with adhesive strips, Gant's method, iii, 375
- Caudal anesthesia, i, 103
solutions for, i, 105
- appendages, i, 168
- Caustic pastes in malignant growths of anorectal region, ii, 340

- Caustics, chemical, in treatment of varicose internal hemorrhoids, i, 478
- Cauterants in anorectal ulceration, ii, 100
- Cauterization for anal fissure, i, 259
 in anorectal ulceration, ii, 101
 in fecal incontinence, i, 414
 in malignant growths of anorectal region, ii, 334
 in treatment of internal varicose hemorrhoids, i, 479
 linear, in procidentia ani, ii, 37
- Cautery and clamp operation for internal hemorrhoids, i, 513
 technic, i, 514
 for non-malignant growths of anorectal region, ii, 276
- Paquelin, in anorectal fistula, i, 357
- Cavity, embryonic, i, 1
- Cecal and appendical openings, closure of, iii, 388
 mesocolon, ii, 440
- Cecostomy, iii, 396
 and ilcocecostomy, Gant's, advantages of, iii, 369
 with an arrangement for irrigating small intestine and colon, iii, 372
 in malignant growths of colon and sigmoid flexure, iii, 343
 appendicostomy and, comparative advantages of, iii, 369
 disadvantages of, iii, 369
 general remarks, iii, 366
 Gibson's, iii, 379
 history, iii, 365
 in non-malignant growths of anorectal region, ii, 278
 in tuberculosis of intestines, iii, 66
 indications for, iii, 367
 mortality in, iii, 370
 ordinary, iii, 378
 stab-wound, Gant's, iii, 380
- Cecum, i, 3
 abnormalities of, i, 9
 anatomy of, ii, 427
 apex of, at birth, and diverticula which may be produced, i, 3
 coats of, ii, 429
 diverticula of, iii, 155
 mobile, i, 5
 as cause of chronic obstipation, iii, 224
 openings of, ii, 429
 position, ii, 428
- Cecum, size, ii, 428
- Celiac disease, iii, 114
- Celialgic and enteralgic pains, iii, 135
- Central colostomy, iii, 409
- Cercomonas hominis, iii, 14
- Cerebrospinal meningitis, diarrhea in, iii, 106
- Cestodic infection, iii, 20
 diagnosis, iii, 21
 symptoms, iii, 21
 treatment, iii, 21
- Chafing, ii, 137
- Chancere, anal, ii, 185
 anorectal, ii, 185. See also *Anorectal chancres*.
 chancroids and, differentiation, ii, 182
- Chancroidal stricture, anorectal, ii, 214
 ulcers of anorectal region, ii, 88
- Chancroids, ii, 181
 anovular, ii, 181
 diagnosis, ii, 182
 etiology, ii, 181
 symptoms, ii, 182
 treatment, ii, 183
- Changing the intestinal flora in colonic infections and other disturbances, iii, 392
- Chattanooga vibrator and vibratodes, iii, 205
- Chemical action of alimentary digestive secretions, ii, 441
 caustics in treatment of varicose internal hemorrhoids, i, 478
 poisoning, iii, 84
- Chetwood's method in fecal incontinence operation, i, 414
 of rectal extirpation, ii, 345
- Childbirth injuries as cause of anorectal diseases, i, 95
- Childhood and infancy, colonic, sigmoidal, rectal, and anal diseases of, iii, 441
- Children and adults, fecal incontinence of, i, 400. See also *Fecal incontinence*.
 chronic constipation in, prescriptions for, iii, 215
- Chilling, diarrhea from, iii, 100
- Chilodon dentatum, iii, 15
- Chloroform anesthesia, i, 97
- Cholera, diarrhea in, iii, 112
 infantum, iii, 113
 morbus, iii, 113
 winter, iii, 113
- Choleriform diarrhea, iii, 112
- Choline diarrhea, iii, 112
- Chromatosis, iii, 86

- Chromatosis, hematogenous, iii, 87
 hepatogenous, iii, 87
 intestinal, iii, 86
 metabolic, iii, 87
- Chyme, ii, 441
 and feces, time required for transportation
 of, through different segments of alimentary tract, ii, 445, 446
- Cicatricial tissue complicating fistula operations, i, 371
- Ciliate colitis, iii, 14
- Ciliates, iii, 15
- Clamp and cautery operation for internal hemorrhoids, i, 513
 technic, i, 514
 for non-malignant growths of anorectal region, ii, 276
 colostomy, Gant's, iii, 414
 hemorrhoidal, Gant's, i, 515, 517
 operation for non-malignant anorectal growths, ii, 270
 for procidentia ani, ii, 38
 Gant's, for closing colostomy opening, iii, 434
 valve, Gant's, ii, 270, 273
 valvotomy, Gant's, iii, 290
- Clip, lead, Gant's, ii, 399, 401
- Cloaca, i, 6
 formation of, from hind gut during third week, i, 2
- Clysters in constipation, iii, 197
- Coal-oil high enema in amebic colitis, ii, 543
- Cocain as anesthetic, i, 114
- Coccidia, iii, 15
- Coccidic colitis, iii, 14
- Coccidium bigeminum, iii, 15
 cuniculi, iii, 15
 hominis, iii, 15
- Coccygeous pruritus ani, vaccine therapy in, ii, 126
- Coccydinia, i, 173
 diagnosis, i, 174
 etiopathology, i, 173
 prognosis, i, 175
 surgical treatment, i, 162
 symptoms, i, 174
 treatment, i, 175
 operative, i, 175
- Coccygeal body, i, 41
 diseases and tumors of, i, 176
 displacements, fractures, dislocations, iii, 446
- Coccygeal gland, i, 8
 necrosis, i, 172
- Coccygectomy, i, 163
 hook, Gant's, i, 167
 technic, i, 164, 166
- Coccygeus muscles, i, 35
- Coccyx, corns over, ii, 263
 deformities of, subcutaneous tenotomy in, i, 164
 deviated, as cause of chronic rectal obstruction, iii, 245
 deviation of, i, 159
 anterior, i, 160
 lateral, i, 160
 posterior, i, 160
 examination of, i, 83
 excision of, i, 163
 technic, i, 164, 166
 malformations of, i, 159
 diagnosis, i, 162
 symptoms, i, 161
 treatment, i, 162
 Nott's excision, i, 164
- Cochin-China diarrhea, iii, 114
- Cochinchinitis, iii, 114
- Coexisting relations between anorectal and other diseases, i, 93
- Coffey-Mayo-Balfour technic in abdomino-perineal proctectomy, ii, 422
- Colectomy, Gant's, iii, 354
 in malignant growths of colon and sigmoid flexure, iii, 350
- Coley's mixed toxin as cancer remedy, ii, 341
- Colic, iii, 94
 diagnostic significance of, ii, 456
 mucous, ii, 510
- Colitis, i, 260; ii, 515. See also *Catarrhal enterocolitis*.
 amebic, ii, 525. See also *Amebic colitis*.
 and acute embolic enteritis, diarrhea from, iii, 103
 and enteritis, syphilitic, iii, 74. See also *Syphilitic enteritis and colitis*.
 and sigmoiditis, gonorrheal, iii, 79
 atrophic, ii, 517
 bacillary, iii, 1. See also *Bacillary colitis*.
 balantidic, iii, 14, 15
 chronic, treatment, ii, 520
 ciliate, iii, 14
 coccidic, iii, 14
 flagellate, iii, 14

- Colitis, hemorrhagic, iii, 39. See also *Hemorrhagic colitis*.
 mixed infection, iii, 18
 protozoal, iii, 14
- Colloid cancer, ii, 310
 metals as cancer remedy, ii, 340
- Colon, absorptive power of, ii, 443
 amebic ulcers of, ii, 531
 anatomy of, ii, 427
 and sigmoid flexure, benign growths of, iii, 317
 adenoma, iii, 318
 cysts, iii, 326
 diagnosis, iii, 325
 etiology, iii, 317
 fibroma of, iii, 322
 gas cysts of, iii, 327
 inflammatory tumor of, iii, 322
 lipoma of, iii, 322
 multiple adenoma, iii, 320
 myoma, iii, 322
 omental cysts, iii, 328
 pathology, iii, 317
 relative frequency and location of various growths, iii, 318
 symptoms, iii, 323
 treatment, iii, 325
 blood-vessels of, ii, 365
 congenital, idiopathic dilatation of, iii, 292. See also *Hirschsprung's disease*.
 malformations of, ii, 504
 diagnosis, ii, 508
 general remarks, ii, 504
 prognosis, ii, 509
 symptoms, ii, 508
 treatment, ii, 509
 types, ii, 505
 malignant growths of, iii, 330
 appendicostomy in, iii, 342
 carcinoma, iii, 333
 cecostomy and ilocecostomy in, iii, 343
 colectomy, resection, iii, 350
 colostomy in, iii, 344
 diagnosis, iii, 338
 enterostomy in, iii, 343
 etiopathology, iii, 332
 general remarks, iii, 331
 intestinal exclusion in, iii, 347
 palliative treatment, iii, 342
 prognosis, iii, 341
- Colon and sigmoid flexure, malignant growths of, radical treatment, extirpation, iii, 349
 sarcoma, iii, 335
 surgical palliative treatment, iii, 342
 symptoms, iii, 336
 temporary colostomy in, iii, 345
 treatment, iii, 341
 types of, iii, 333
 venereal diseases of, iii, 74
 ascending, i, 3; ii, 431
 blood-supply of, ii, 436
 circular muscle-fibers of, ii, 435
 descending, i, 3; ii, 432
 abnormalities of, i, 10
 diagnostic significance of manifestations pointing to disease in, ii, 455
 displacement of, i, 9
 diverticula of, iii, 155
 embryology, i, 1
 examination and diagnosis of, i, 54
 focal infection of, relation to systemic diseases, iii, 117
 foreign bodies in, ii, 474. See also *Foreign bodies*.
 hemorrhage of, iii, 123
 longitudinal bands of, ii, 435
 lymphatics of, ii, 439
 manifestations and signs of disease involving, ii, 455
 mucous membrane of, ii, 436
 muscular coat of, ii, 435
 nerve supply of, ii, 438
 pelvic, ii, 432
 semilunar folds of, ii, 436
 sensibility of, ii, 454
 serous coat of, ii, 435
 sigmoid, abnormalities of, i, 10
 structure of, ii, 435
 submucous coat of, ii, 436
 transverse, i, 3, 5; ii, 431
 displacements of, i, 10
 tube, inability to introduce into rectum, diagnostic significance, ii, 462
 tuberculosis of, iii, 43. See also *Tuberculosis of intestine, colon, and sigmoid flexure*.
 tumors of. See *Colon and sigmoid flexure, benign growths of, malignant growths of*.
 tunics of, ii, 435
 wounds and injuries of, ii, 463. See also *Wounds of abdominal viscera*.

- Colonic adenoma, ii, 244
 bleeding, blood-picture in, i, 65
 dilatation as cause of chronic obstipation, iii, 236
 diseases of infancy and childhood, iii, 441
 hypertrophy, iii, 292. See also *Hirschsprung's disease*.
 infections, changing intestinal flora in, iii, 392
 irrigation, through-and-through, Gant's method, ii, 392
 lavage in diagnosis, i, 62
 oxygen baths in atonic constipation, iii, 209, 212
 sepsis, blood in, i, 65
 Colopexy in procidentia recti complicated by sphinctroptosis, ii, 52
 Coloproctitis, bacillary, ii, 85
 Coloproctostomy, history of, ii, 344
 in malignant growths of anorectal region, ii, 344
 Colorectostomy in handling bowel ends when sphincter is preserved, ii, 379
 Colostomy and ileostomy in tuberculosis of intestines, iii, 70
 benefits derived from, iii, 400
 central, iii, 409
 clamp, Gant's, iii, 414
 for cancer, duration of life following, Gant's cases, iii, 399
 iliac, iii, 407
 in anorectal stricture, ii, 235
 in fecal incontinence, i, 415
 in malignant growths of anorectal region, ii, 335
 of colon and sigmoid flexure, iii, 344
 in non-malignant growths of anorectal region, ii, 278
 indications for, iii, 397
 inguinal, iii, 407
 left rectus, iii, 409
 method of handling bowel ends in, ii, 373
 two-stage operation for, ii, 375
 mortality in, iii, 399
 opening, closure of, iii, 434
 Gant's clamp operation for, iii, 434
 resection with anastomosis, iii, 437
 permanent, iii, 404
 fecal incontinence in, prevention, iii, 413
 hernia resulting from, treatment, iii, 419
 postoperative treatment, iii, 415
 site for, iii, 406
 Colostomy, permanent, technic, iii, 405
 to avoid postoperative rectal and sigmoidal procidentia, iii, 411
 preliminary, iii, 402
 in connection with combined operation for malignant anorectal growths, ii, 418
 in surgical treatment of malignant anorectal growths, ii, 350, 353
 technic, iii, 403
 temporary, iii, 402
 in malignant growths of colon and sigmoid flexure, iii, 345
 vaginal, Gant's, iii, 419
 technic, iii, 420
 with abdominoperineal proctectomy, ii, 422
 Colotomy, i, 386; iii, 396, 397
 Columns of Morgagni, i, 17
 Combined, cuff, plicating, and sigmoidopexy operation of Gant in procidentia recti et sigmoidæ, ii, 50
 fistula, i, 391
 operation for malignant growths of anorectal region, advantages of, ii, 416
 disadvantages of, ii, 417
 Gant's technic, ii, 418
 Gant's, in procidentia sigmoidæ, ii, 47
 Compensatory diarrhea, iii, 106
 Complete anorectal fistula, i, 316
 external anorectal fistula, i, 322
 fistula, i, 295
 internal anorectal fistula, i, 320
 Complex anorectal fistula, i, 324
 fistula, i, 295
 Complicated anorectal fistula, i, 324
 Compress, gauze, pyramidal-shaped, Gant's, i, 511
 Concretions, ii, 494. See also *Intestinal calculi*.
 hairy, ii, 496
 miscellaneous, ii, 500
 Condyloma acuminata, ii, 151, 197
 and lata in childhood, iii, 454
 diagnosis, ii, 199
 symptoms, ii, 198
 treatment, ii, 200
 operative, ii, 200
 causing anorectal hemorrhage, ii, 5
 in diagnosis of anorectal diseases; i, 49
 lata, ii, 188

- Condyloma lata, diagnosis, ii, 190
 symptoms, ii, 190
 treatment, ii, 190
 luetic and non-syphilitic, local anesthesia
 operation for, i, 109
 of anorectal region, ii, 250
 of perianal region complicating chronic
 hypertrophic proctitis, i, 270
 Congenital abnormalities and displacements
 of intestine, i, 9
 anorectal anomalies, iii, 444
 deformities, i, 123
 classification, i, 126
 in chronic rectal obstruction, iii, 244
 Keith's table of, i, 126
 postoperative treatment, i, 151
 prognosis, i, 151
 synopsis of 8 cases treated by Gant, i,
 127
 stricture, ii, 208
 idiopathic dilatation of colon and sigmoid
 flexure, iii, 292. See also *Hirschsprung's*
 disease.
 luetic fissures in anorectal stricture, ii, 217
 markings, diagnostic significance of, ii, 458
 megacolon, iii, 292. See also *Hirschsprung's*
 disease.
 umbilical hernia, i, 2
 Connell's continuous suture, iii, 358
 Constipation, iii, 94, 133
 acute, iii, 176
 and fecal impaction causing anorectal
 hemorrhage, ii, 4
 alternating with diarrhea, diagnostic sig-
 nificance of, ii, 456
 as cause of anal fissure, i, 228
 atonic, in childhood, iii, 460
 chronic atonic, iii, 179
 age in, iii, 179
 analysis of stomach contents in, iii,
 189
 anoscopic examination, iii, 190
 auscultation in, iii, 188
 chemical causes, iii, 182
 chronic invalidism in, iii, 180
 colitis causing, iii, 182
 colonic oxygen baths in, iii, 209, 212
 constitutional symptoms, iii, 185
 diagnosis, iii, 186
 dietetic causes, iii, 183
 treatment, iii, 192
 digital examination in, iii, 190
 Constipation, chronic atonic, dinner or vege-
 table pills in, iii, 215
 drug and enema habits, iii, 181
 electricity in, iii, 205
 etiology, iii, 179
 examination of blood in, iii, 189
 of sigmoid flexure, rectum, and anus,
 iii, 189
 of urine in, iii, 189
 exercise in, iii, 193
 general inspection of patient in, iii, 187
 heredity in, iii, 179
 hydragogues in, iii, 214
 hydrotherapy in, iii, 195
 in infants and children, iii, 179
 treatment, iii, 215
 inflation of colon in, iii, 188, 211
 instrumentation in, iii, 210
 intestinal atony in, iii, 180
 irregular hours for evacuations in, iii,
 181
 laxatives in, iii, 214, 215
 local symptoms, iii, 185
 macroscopic and microscopic examina-
 tion of feces in, iii, 189
 massage in, iii, 201
 medicinal treatment, iii, 212
 membranous colitis causing, iii, 183
 miscellaneous causes, iii, 183
 moral treatment, iii, 192
 neurogenic and reflex symptoms, iii,
 185
 obstipation and, differential diagnosis,
 iii, 190
 occupation and environment in, iii, 180
 oils in, iii, 214
 percussion in, iii, 188
 pericolitis causing, iii, 182
 perisigmoiditis causing, iii, 182
 physical measures in, iii, 193
 proctoscopic and sigmoidoscopic ex-
 amination in, iii, 190
 prophylactic treatment, iii, 191
 psychic influences, iii, 083
 purgatives in, iii, 214
 drastic, iii, 215
 rectal tamponing in, iii, 211
 rectocolonic enmata in, iii, 188
 sex in, iii, 179
 symptoms, iii, 184
 transillumination in, iii, 188
 treatment, iii, 190

- Constipation, chronic atonic, upright posture
in, iii, 180
vibration in, iii, 204
weakening of abdominal muscles in,
iii, 180
x-ray and fluoroscopic examination in,
iii, 188
medical, iii, 179
definition, iii, 173
diagnostic significance of, ii, 455
following hemorrhoid operations, i, 541
general remarks, iii, 173
in anal fissure, i, 232
in anorectal malignant disease, ii, 320
ulceration, ii, 92
in diagnosis of anorectal diseases, i, 51
psychic, iii, 95, 217
treatment, iii, 218
spastic, iii, 216
diagnosis of, iii, 216
diagnostic significance of, ii, 456
in diagnosis of anorectal diseases, i, 52
symptoms, iii, 216
treatment, iii, 217
surgical, in childhood, iii, 455
enema in diagnosis, iii, 456
- Contagious diseases, acute, diarrhea in, iii, 109
- Contused wounds of anorectal region, i, 191
- Contusions of abdomen, small intestine,
colon, and sigmoid flexure, ii, 463
- Coproliths, ii, 500
- Coprostasis, iii, 304. See also *Fecal impaction*.
- Coprostatic diarrhea, iii, 103
- Corns on buttocks, ii, 263
- Coronary ligaments, i, 5
- Corrugator cutis ani muscle, i, 33
- Corset, Munson corrective, iii, 254
- Cramps, diagnostic significance of, ii, 456
- Crawling sensations, diagnostic significance
of, ii, 461
- Crowder's table showing frequency of pri-
mary tuberculosis, iii, 45
- Crushing operation for hemorrhoids, i, 480,
481
- Cryptitis, i, 212
anal fissure and, differentiation, i, 240
as cause of chronic rectal obstipation, iii,
245
causing anorectal hemorrhage, ii, 5
definition, i, 212
diagnosis, i, 215
etiopathology, i, 213
- Cryptitis in anal fissure, i, 234
in diagnosis of anorectal diseases, i, 51
symptoms, i, 214
treatment, i, 216
surgical, i, 217
- Crypts, anesthetization of, i, 210
inflamed, in childhood, iii, 450
Morgagni's, function, i, 213
of Lieberkühn, ii, 436
of Morgagni, i, 18
- Curettage in malignant growths of anorectal
region, ii, 334
- Curets, i, 79, 81, 342
- Cushing right-angle suture, iii, 361
- Cutaneous anorectal ulceration, ii, 61
- Cylindric-columnar-celled carcinoma, ii, 299
- Cystitis, postoperative, i, 539
- Cysts, dermoid, of anorectal region, ii, 262
sacrococcygeal, i, 168, 169
gas, fecal, mucous, of anorectal region, ii,
279. See also *Anorectal region, gas,
fecal, and mucous cysts of*.
of colon and sigmoid flexure, iii, 327
hair, i, 387
of anorectal region, ii, 260
retention, ii, 261
omental, of colon and sigmoid flexure, iii,
328
retroperitoneal and mesenteric, of colon
and sigmoid flexure, iii, 326
sacrococcygeal, i, 167, 178
in childhood, iii, 446
- DANGER zone of rectum, ii, 365, 366
- Darmac's gauze carrier, Gant's modification
of, for introducing stypticized gauze into
rectum, ii, 11
- Davidson's syringe, iii, 310
- Death, black, iii, 115
from spinal anesthesia, cause, i, 100
- Defecation, ii, 449
effect of ignoring desire, ii, 453
factors facilitating, ii, 453
interfering with, ii, 453
origin of impulse, ii, 454
steps in process of, ii, 451
stimuli responsible for, ii, 450
- Deformities, anorectal, congenital, i, 123
classification, i, 126
Keith's table of, i, 126
postoperative treatment, i, 151
prognosis, i, 151

- Deformities, anorectal, congenital, synopsis of 8 cases treated by Gant, i, 127
- Delayed healing in hemorrhoid operations, i, 540
- Delorme's operation for procidentia sigmoidæ, ii, 55
- Depigmentation of skin in pruritus ani, ii, 114
- Dermatitis, postoperative, i, 540
venenata, ii, 142
- Dermatobia cyaniventrix, iii, 116
- Dermoid cyst fistula, i, 387
diagnosis, i, 388
cysts of anorectal region, ii, 262
sacrococcygeal, i, 168, 169
- Descending colon, i, 3; ii, 432
abnormalities of, i, 10
- Desire to stool, frequent, in diagnosis of anorectal diseases, i, 49
- Deviation of coccyx, i, 159
anterior, i, 160
lateral, i, 160
posterior, i, 160
- Diabetes as contraindication to hemorrhoidal operations, i, 493
bronzed, iii, 86
manifestations of, in anorectal diseases, i, 94
- Diabetic sloughing and coma following hemorrhoid operation, i, 542
- Diacetic acid in urine, i, 64
- Diagnosis of stomach, small intestine, colon, rectum, anus, and buttocks, i, 54
- Diagnostic significance of manifestations pointing to anorectal diseases, i, 44
to disease in colon and sigmoid flexure, ii, 455
- Diarrhea, iii, 134
alba, iii, 114
alcoholic, iii, 105
alternating with constipation, diagnostic significance of, ii, 456
anemic, iii, 104
anthrax, iii, 115
cachectic, iii, 104
cathartica, iii, 99
cholericform, iii, 112
cholerine, iii, 112
chylosa, iii, 114
Cochin-China, iii, 114
compensatory, iii, 106
complicating epilepsy, iii, 95
coprostatic, iii, 103
diagnostic significance of, ii, 455
- Diarrhea due to catarrhal and infectious enterocolitis, emergency prescriptions for, iii, 462
dyspeptic, iii, 91, 93
El Bicho, iii, 116
enterogenic, iii, 93. See also *Enterogenic diarrhea*.
eosinophilic, iii, 102
following hemorrhoid operations, i, 541
from acute embolic enteritis and colitis, iii, 103
from burns, iii, 100
from chilling, iii, 100
from drinking water and cold beverages iii, 101
from intestinal myiasis, iii, 115, 116
from irregularities in living, iii, 99
from sun- and heat-strokes, iii, 101
gastrogenic, iii, 91
gouty, iii, 106
hill, iii, 114
in acute contagious diseases, iii, 109
infectious diseases, iii, 109
in agoraphobia, iii, 100
in anorectal malignant disease, ii, 320
ulceration, ii, 92
in arteriosclerosis, iii, 106
in cerebrospinal meningitis, iii, 106
in cholera, iii, 112
in diagnosis of anorectal diseases, i, 52
in enteritis crouposa necrotica, iii, 106
in hypodynamia cordis, iii, 100
in influenza, iii, 109
in obesity, iii, 103
in pernicious anemia, iii, 104
in reflex disturbances, iii, 102
in relapsing fever, iii, 112
in sitophobia, iii, 100
in typhoid fever, iii, 109
in yellow fever, iii, 111
leukemic, iii, 104
lienteric, iii, 91, 93
marasmic, iii, 105
mechanical, iii, 102
neurogenic, iii, 94
diagnostic significance of, ii, 461
nocturnal, iii, 94, 102
pancreatic, diagnosis, ii, 519
pseudodysenteric, iii, 115
psychic, iii, 95
puerperal, iii, 115
sand, ii, 494

- Diarrhea, scorbutic, iii, 106
 senile, iii, 102
 septic, iii, 113
 tropical, iii, 114
 treatment, iii, 114
- Diathermy in malignant growths of ano-
 rectal region, ii, 340, 423
- Dieffenbach's operation for procidentia sig-
 moidæ, ii, 55
- Diffuse septic abscess, i, 311
- Digestion, ii, 441
- Digestive disturbance in diagnosis of anorectal
 diseases, i, 51
 hysteria, iii, 140
 secretions, alimentary, chemical action of,
 ii, 441
 tube and mesenteries in human fetus, stages
 in development of, i, 3
- Digital examination, i, 82-84
 in malignant growths of anorectal region,
 ii, 325
- Dilatation, anal, i, 82
 gradual, in anorectal stricture, ii, 227
 of colon and sigmoid flexure, congenital
 idiopathic, iii, 292. See also *Hirsch-
 sprung's disease*.
- Dilators, anal, self-retaining, i, 225; ii, 225;
 iii, 286
 Hirschmann's, iii, 288
 Kelly's, i, 82; iii, 311
 spring stricture, Gant's, ii, 227
 Young's, i, 82
- Dimples, postanal, i, 178; ii, 264
 symptoms and diagnosis, i, 180
 treatment, i, 180
 postsacral, and discharge in diagnosis of
 anorectal diseases, i, 50
 sacrococcygeal, i, 178
- Diphtheric abscesses, i, 308
 anorectal stricture, ii, 214
 membrane, ii, 529, 531
- Director and knife, curved fenestrated
 grooved, Gant's, i, 355
 angular grooved, Gant's, i, 358
 grooved, i, 341
- Dirt eaters' anemia, iii, 23
- Discharge in anal fissure, i, 232
 in anorectal malignant disease, ii, 321
 ulceration, ii, 91
 in diagnosis of anorectal diseases, i, 47
 postsacral dimple and, in diagnosis of ano-
 rectal diseases, i, 50
- Discharges of pus, blood, mucus, and tissue
 debris, diagnostic significance of, ii, 457
- Discoloration and inflammation of perianal
 skin in diagnosis of anorectal diseases, i, 50
 and skin lesions, diagnostic importance of,
 ii, 461
- Disease, hookworm, iii, 23
- Diseases of coccygeal body, i, 176
- Dislocations, sacrococcygeal, i, 165
- Displacements, congenital and acquired, of
 intestine, i, 9
- Distention, i, 62
- Disturbance in neighboring organs, diagnostic
 significance of, ii, 460
- Disturbances and disease in other regions
 caused by anorectal affections, i, 96
- Diverticula, anorectal, ii, 286. See also
Anorectal diverticula.
 as cause of chronic obstipation, iii, 243
 causing anorectal hemorrhage, ii, 6
 definition, iii, 155
 of intestines, acquired, iii, 155
 congenital, iii, 155
 false, iii, 155, 156
 general remarks, iii, 155
 true, iii, 155
 of small intestine, cecum, colon, and sig-
 moid flexure, iii, 155
- Diverticulitis, blood in, i, 65
 definition, iii, 155
 Meckel's, symptoms, iii, 171
 of cecum, colon, and sigmoid flexure, iii,
 155, 157
 diagnosis, iii, 162
 etiology, iii, 157
 pathology, iii, 159
 prognosis, iii, 164
 symptoms, iii, 161
 treatment, iii, 165
 of sigmoid flexure complicated by abscess,
 iii, 167
- Diverticulosis of small intestine, cecum,
 colon, and sigmoid flexure, iii, 155
- Diverticulum, Meckel's, i, 2; iii, 170
 treatment, iii, 172
 of upper rectum simulating an old abscess
 cavity, ii, 291
 treatment, ii, 291
 tube-like, in anal canal filled with feces,
 case report, ii, 284
 with uterine procidentia simulating fecal
 cyst, ii, 285

- Division operation in anorectal fistula, i, 346
 Divulsion, forcible, for anal fissure, i, 254
 in anorectal stricture, ii, 229
 in malignant growths of anorectal region,
 ii, 334
 Douche, anal, ascending, Gant's, i, 473
 liver and abdominal, iii, 202
 Scotch, for atonic constipation, iii, 201
 spinal, in chronic atonic constipation, iii,
 198
 Dressing forceps, i, 79, 81
 Drinking water and cold beverages, diarrhea
 from, iii, 101
 in constipation, iii, 196
 Drug habits in atonic constipation, iii, 181
 Dry canal. spinal anesthesia in, i, 102
 Ducrey's bacillus, ii, 181, 199
 Duct, intestinal, i, 2
 vitelline, i, 1
 Duodenitis, ii, 515
 Duodenostomy, iii, 394
 Duodenum, i, 4; ii, 426
 displacement of, i, 9
 Dupuytren's operation for procidentia sig-
 moidæ, ii, 56
 Duret's operation for procidentia sigmoidæ,
 ii, 55
 Dwarf tapeworm, iii, 20, 21
 Dynamic obstruction, iii, 219
 Dysenteric anorectal ulceration, ii, 81, 85
 bacilli, chief differentiating characteristics
 of, Mason's table of, iii, 7
 Dysentery, iii, 14. See also *Balantidic colitis*.
 amebic, ii, 525
 asylum, iii, 1
 bacillary, iii, 1. See also *Bacillary colitis*.
 tropical, ii, 525
 Dyspepsia, fermentation, iii, 92
 intestinalis, iii, 93
 Dyspeptic diarrhea, iii, 91, 93
- ÉCRASEMENT in treatment of internal varicose
 hemorrhoids, i, 479
 Ectoderm, i, 5
 Eczema ani, ii, 125
 in childhood, iii, 454
 marginatum, ii, 139
 perianal, ii, 138
 treatment, ii, 138-140
 Edema of skin, postoperative, i, 539
 Effleurage in atonic constipation, iii, 201
 Einhorn's long-jointed intestinal tube, ii, 519
- El Bicho diarrhea, iii, 116
 Electric cabinet, Gant's, iii, 210
 Electricity in anal fissure, i, 246
 in anorectal fistula, i, 335
 in atonic constipation, iii, 205
 in malignant growths of anorectal region,
 ii, 333
 Electrocauterization for closing appendi-
 costomy and cecostomy openings, iii, 388
 Electrochemical agents in anorectal fistula, i,
 335
 Electrodes, iii, 211, 212
 hydriatic, iii, 311
 Electrohydrotherapy in atonic constipation,
 iii, 209
 Electrolysis in anorectal stricture, ii, 227
 in treatment of internal varicose hemor-
 rhoids, i, 479
 Elephantiasis, anovular, ii, 142
 ulcerative, ii, 172. See also *Anovular*
 ulcerative elephantiasis.
 ulcerative, perianal lupus and, differential
 diagnosis, ii, 170
 Elevated lithotomy position, ii, 350
 Elliptic incisions for anorectal non-malignant
 growths, ii, 277
 Elting's method in excision operation for
 anorectal fistula, i, 365
 Embolic enteritis, acute, and colitis, diarrhea
 from, iii, 103
 Embolism, mesenteric, iii, 329
 Embryo, external genital parts of, terms
 applied to, diagram showing, i, 6
 Embryology of stomach, small intestine,
 colon, and rectum, i, 1
 Embryonic cavity, i, 1
 Emotions, psychic, manifestations of, in
 anorectal diseases, i, 94
 Emphysema, intestinal, iii, 327
 Encephaloid cancer, ii, 309
 Enchondroma of anorectal region, ii, 257
 Endemic hematuria, symptoms, iii, 36
 Endocarditis, relation of focal infection of
 colon, sigmoid flexure, and rectum to, iii,
 117
 Endothelium of serous coat of stomach, i, 8
 Enema habits in atonic constipation, iii, 181
 in constipation, iii, 196, 197
 in diagnosing obstipation in childhood, iii,
 455
 syringe, baby, hard-rubber piston, iii, 197
 tubes, iii, 64

- Entameba coli**, ii, 525
 histolytica, ii, 525, 527
 rectocolonic infection from, ii, 81
Enteralgic and celialgic pains, iii, 135
Enteric tuberculosis of intestines, iii, 47
Enteritis, ii, 515. See also *Catarrhal enterocolitis*.
 acute embolic, and colitis, diarrhea from, iii, 103
 and colitis, syphilitic, iii, 74. See also *Syphilitic enteritis and colitis*.
 crouposa necrotica, diarrhea in, iii, 106
 follicular, ii, 517
 hypertrophic, ii, 517
Entero-anastomosis, iii, 429
Enterocecal valve, ii, 430
Enterocecostomy in tuberculosis of intestines, iii, 66
Enteroclysis and enemata in constipation, iii, 196
Enterocolitis, catarrhal, ii, 515. See also *Catarrhal enterocolitis*.
 chronic, treatment, ii, 520
 in childhood, iii, 461
 treatment, iii, 462
 membranous, ii, 510; iii, 139
Enterogenic diarrhea, iii, 93
 diagnosis, iii, 94
 symptoms, iii, 94
 treatment, iii, 94
Enterokinase, ii, 442
Enteroliths, ii, 494, 498. See also *Intestinal calculi*.
Enteroperitoneal tuberculosis of intestines, iii, 48
 diagnosis, iii, 60
 symptoms, iii, 56
Enteroptosis, diagnostic significance of, ii, 456
Enterospasm, iii, 134
 as cause of chronic obstipation, iii, 243
 diagnostic significance of, ii, 456
 in childhood, iii, 459
 in diagnosis of anorectal diseases, i, 52
Enterostomy, iii, 394
 in malignant growths of colon and sigmoid flexure, iii, 343
 in tuberculosis of intestines, iii, 70
 indications for, iii, 395
 technic, iii, 395
Enterovesical fistula, i, 376
Entoderm, i, 5, 8
Eosinophilic diarrhea, iii, 102
Epiblast, i, 5
Epilepsy, diarrhea complicating, iii, 95
Epinephrin added to anesthetic solution, i, 122
Epithelial cancer, types of, ii, 299
 pearls, ii, 303
Epithelioma, anal, ii, 90
 anovulvar lupus of perianal region and, differential diagnosis, ii, 170
 of anorectal region, ii, 293. See also *Anorectal region, malignant growths of*.
Epitheliomatous anal ulceration, rodent anorectal ulceration and, differentiation, ii, 64
Equipment for examination of sigmoid flexure, rectum, and anus, i, 73
Erect position for rectal examination, i, 72, 73
Erosions, perianal, ii, 188
Eructations in diagnosis, i, 54
Erysipelas, ii, 142; iii, 113
Erythema in childhood, iii, 454
 intertrigo, ii, 137
Esthiomène, ii, 79, 80, 142, 169, 172. See also *Anovulvar ulcerative elephantiasis*.
Ether anesthesia, i, 97
 spray anesthesia, i, 114
Ethyl chlorid anesthesia, i, 98, 114
Eucain as anesthetic, i, 114
 advantages, i, 115
Evacuator, rectal, Gant's, ii, 11
Exaggerated knee-chest position, ii, 325
 left Sims' position, ii, 350
Examination, anoscopic, i, 85
 technic, i, 86
 digital, i, 82-84
 in malignant growths of anorectal region, ii, 325
 microscopic, in malignant growths of anorectal region, ii, 327
 of blood, i, 64
 of coccyx, i, 83
 of patient, i, 54
 anoscopic, i, 85
 technic, i, 86
 auscultation, i, 61
 blood of, 55, 64
 blood-pressure, i, 55
 colonic lavage, i, 62
 digital, i, 82-84
 general remarks, i, 54
 history taking, i, 55
 inflation, i, 62
 inspection, i, 57

- Examination of patient, neighboring organs,**
 i, 92
 other organs, i, 92
 palpation, i, 59
 percussion, i, 62
 proctoscopic, i, 85
 technic, i, 86
 sigmoidoscopic, i, 85
 technic, i, 86
 stomach contents, i, 62
 stools of, i, 63
 transillumination, i, 62
 tuberculin test, i, 69
 urine of, i, 55, 64
 Wassermann test, i, 69
 with bowel full and empty, i, 55
 x-ray, i, 65
- of sigmoid flexure, rectum, and anus, i, 69
 anesthesia, i, 70
 equipment for, i, 73
 instruments for, i, 74
 position for, i, 70, 86
 preparation, i, 69
- of small intestine, colon, rectum, anus, and
 buttocks, i, 54
- of stomach contents, i, 62
- of stools, i, 63
- of urine, i, 64
- proctoscopic, i, 85
 technic, i, 86
 in malignant growths of anorectal
 region, ii, 327
- sigmoidoscopic, i, 85
 technic, i, 86
- x-ray, in malignant growths of anorectal
 region, ii, 327
- Examining specula, i, 74**
- Excision, anorectal, and resection, history
 and evolution of, ii, 342**
- for non-malignant growths of anorectal
 region, ii, 276
- in anorectal stricture, ii, 231
- of mucous membrane under local anes-
 thesia for procidentia ani, ii, 42
- operation for anorectal fistula, i, 360
 for fissure in ano, Gant's, i, 256, 258
 for internal hemorrhoids, i, 518
 in procidentia sigmoidæ, Gant's, ii, 52
 mortality of, ii, 354
- perineal, in malignant growths of anorectal
 region, ii, 383
- sacral, history and evolution of, ii, 342
- Excision, sacral, in malignant growths of ano-
 rectal region, ii, 397
- vaginal, history and evolution of, ii, 343
 in malignant growths of anorectal region,
 ii, 343
- Exclusion, intestinal, iii, 422**
 in malignant growths of colon and sig-
 moid flexure, iii, 347
- Excoriation in anorectal ulceration, ii, 91**
 of buttocks, postoperative, i, 540
 of mucosa and skin in anal fissure, i, 233
- Excrescences, hypertrophic, in diagnosis of
 anorectal diseases, i, 51**
- Exploration, digital, i, 82-84**
- Exploratory laparotomy, i, 85**
- External anorectal fistula, blind, i, 318**
 complete, i, 322
- fistula, blind, i, 295
- genital parts of embryo, terms applied to,
 diagram showing, i, 6
- sphincter ani, i, 33
 function, i, 34
 nerve supply, i, 34
- spasm of, i, 220. See also *Sphincter-
 algia*.
- Extirpation in malignant growths of colon
 and sigmoid flexure, iii, 349**
- Extradural anesthesia, i, 103**
- Extra-intestinal pressure as cause of chronic
 obstipation, iii, 223**
- Extrarectal causes, manifestations and dis-
 eases of anorectal region induced by, i, 93**
- fecal cyst, diminutive, diverticulum, case
 report, ii, 282
- large, diverticulum, case report, ii, 283
- pressure as cause of chronic rectal obstipa-
 tion, iii, 244
- stricture, anorectal, ii, 217
- Eye abnormalities inducing rectocolonic dis-
 turbances, iii, 89**
- FALCIFORM ligaments, i, 5**
- Faradic current in atonic constipation, iii, 207**
- Fascia, pelvic, i, 41**
 rectovesical, i, 41
- Febris recurrens, diarrhea in, iii, 112**
- Fecal calculi, ii, 500**
 cysts of anorectal region, ii, 279
 case histories, ii, 281-285
 diagnosis, ii, 280
 symptoms, ii, 280
 treatment, ii, 281

Fecal fistula, i, 2

- and abdominal abscess, diagnostic significance of, ii, 458
- artificial anus and, points of differentiation, iii, 433
- closure of, iii, 437
 - Gant's clamp operation for, iii, 434
 - resection with anastomosis, iii, 437
- definition, iii, 433
- impaction, iii, 304
 - and constipation causing anorectal hemorrhage, ii, 4
- as cause of chronic rectal obstipation, iii, 245
- cancer of large intestine and rectum
 - and, differential diagnosis, iii, 308
- chronic, iii, 248
- definition, iii, 173
- diagnosis, iii, 307
- diagnostic significance of, ii, 456
- etiology, iii, 304
- following hemorrhoid operations, i, 541
- general remarks, iii, 304
- in anorectal malignant disease, ii, 320
- in diagnosis of anorectal diseases, i, 50
- in childhood, iii, 454
- prognosis, iii, 309
- surgical treatment, iii, 311
- symptoms, iii, 305
- synopsis of 45 cases treated by Gant, iii, 312-315
- treatment, iii, 309
- incontinence, i, 29, 400; iii, 137
 - as sequelæ of rectal excision, ii, 360
- degrees of, i, 408
- diagnosis, i, 409
- etiology, i, 401
- following fistula operation, i, 372
 - hemorrhoid operations, i, 525
 - incision of sphincters, i, 349
 - proctectomy, Gant's method of lessening and preventing, ii, 377
- from prolapsing polyp, i, 416
- general remarks, i, 400
- in children, i, 417; iii, 453
 - diagnosis, i, 417
 - etiology, i, 417
 - treatment, i, 418
- in diagnosis of anorectal diseases, i, 50
- in malignant growths of anorectal region, ii, 323
- non-operative causes, i, 401

Fecal incontinence of adults and children, i, 400

- preparation of patient for operation in, i, 410
- prognosis, i, 416
- surgical causes, i, 402
- symptoms, i, 408
- treatment, i, 409
 - cauterization in, i, 414
 - Chetwood's method, i, 414
 - colostomy in, i, 415
 - Gant's operation for, i, 411-413
 - Gersuny's method, i, 414
 - non-operative, i, 409
 - palliative, i, 410
 - plastic operations in, i, 411
 - postoperative, i, 416
 - prophylactic, i, 409
 - shortening sphincter in, i, 416
 - surgical, i, 410
 - Willem's method, i, 414
- reservoir, soft-rubber, Gant's, ii, 236, 395, 396, 416

Feces, ii, 447

- altered, diagnostic significance of, ii, 459
 - in diagnosis of anorectal disease, i, 49
- amount of daily discharge, ii, 447
- and chyme, time required for transportation of, through different segments of alimentary tract, ii, 445, 446
- change in character of, in anal fissure, i, 234
- color, ii, 447, 448
- consistence of, ii, 447, 448
- impacted, as cause of anal fissure, i, 228
 - in anal fissure, i, 232
- in rectum, i, 15
- incontinence of, as sequelæ of rectal excision, ii, 360
- reaction of, ii, 448
- shape, ii, 447

Fecoliths, ii, 500

- enteroliths, and intestinal calculi as cause of chronic rectal obstipation, iii, 245

Feeling of weight and fulness in anorectal ulceration, ii, 92

Female reproductive organs, diseases of, manifested in anorectal diseases, i, 94

Fermentation dyspepsia, iii, 92

Fetal inclusions, sacrococcygeal, i, 168

Fetus, human, digestive tube and mesenteries of, stages in development, i, 3

Fibroma of anorectal region, ii, 251

- Fibroma** of colon and sigmoid flexure, iii, 322
- Fibrosclerotic anorectal ulceration**, ii, 77
- tubercular stricture of rectum, ii, 213
- tuberculosis of intestines, iii, 51
- diagnosis, iii, 60
- symptoms, iii, 57
- of upper rectum, ii, 149
- symptoms, ii, 157
- Fibrous bands**, partial occlusion of anus and rectum by, i, 131
- cancer, ii, 309
- Filaria sanguinis hominis**, iii, 114
- Finger**, introduction of, into rectum, inability of, diagnostic significance of, ii, 462
- Fish poisoning**, iii, 82
- tapeworm, iii, 20
- Fissure following hemorrhoid operation**, i, 542
- in ano, i, 227
- appearance, i, 227, 229
- as cause of anorectal abscess, i, 282
- of sphincteralgia, i, 221
- causing anorectal hemorrhage, ii, 4
- change in character of feces in, i, 234
- in childhood, iii, 446
- chronic, i, 231
- complications and sequelæ, i, 235
- constipation in, i, 232
- cryptitis in, i, 234
- diagnosis, i, 236
- differential, i, 237
- direct causes, i, 229
- discharge in, i, 232
- etiology, i, 228
- false, i, 228, 229
- fecal impaction in, i, 232
- flatulence in, i, 234
- general remarks, i, 227
- hemorrhage in, i, 232
- in childhood, iii, 446
- infundibuliform anus in, i, 233
- location, i, 227, 229
- nervousness and melancholia in, i, 234
- pain in, i, 232
- papillitis in, i, 234
- pathology, i, 229
- polypi in, i, 234
- predisposing causes, i, 228
- proctitis in, i, 233
- pruritus ani in, i, 234
- reflex disturbances in, i, 234
- size, i, 227
- sphincteralgia in, i, 232
- Fissure in ano**, stages, i, 231
- symptoms, i, 231
- miscellaneous, i, 235
- treatment, i, 240
- non-operative, i, 241
- electricity, i, 246
- mercurial ointments, i, 246
- of acute fissures, i, 244
- of chronic fissures, i, 245
- of erosions of skin and mucosa, i, 245
- of pain, i, 243, 244
- of sphincteralgia, i, 243, 244
- regulation of stools, i, 241
- rest, i, 245
- restricting diet, i, 243
- topical applications, i, 244
- prophylactic, i, 241
- surgical, i, 246
- anesthesia in, i, 246
- cauterization, i, 259
- divulsion operation, i, 254
- excision operation, i, 256
- forcible divulsion operation, i, 255
- fulguration, i, 259
- Gant's division operation, i, 247
- operations used, i, 247
- partial division operation, i, 253
- preparation of patient, i, 246
- splitting anal canal and sphincter, Gant's operation, i, 248
- submucocutaneous myotomy, i, 253
- V-shaped incision, operation in, i, 254
- true, i, 228, 229
- ulcer and, differential diagnosis, i, 240
- scissors, Gant's, i, 249
- Fissures**, congenital luetic, in anorectal stricture, ii, 217
- Fistula**, anal, definition, i, 313
- fissure and, differentiation, i, 239
- and abscess, chronic, as cause of chronic rectal obstipation, iii, 244
- in anorectal ulceration, ii, 93
- anorectal, i, 313. See also *Anorectal fistula*.
- as cause of anorectal hemorrhage, ii, 5
- Bartholin's gland, i, 388
- blind external, i, 295
- internal, i, 295
- combined, i, 391
- complete, i, 295
- complex, i, 295
- derivation, i, 313

- Fistula, dermoid cyst, i, 387
 diagnosis, i, 388
 enterovesical, i, 376
 fecal. See *Fecal fistula*.
 following anorectal abscess, i, 279
 hemorrhoid operation, i, 541
 horseshoe, i, 40
 in anus, pulmonary, and anorectal tubercu-
 losis, relationship between, i, 393
 operations by local anesthesia, technic, i,
 108
 classification of, i, 339
 preparation of patient for, i, 339
 why unsuccessful, i, 338
 perineal, i, 386
 rectal, definition, i, 313
 rectococcygeal, i, 388
 rectolabial, i, 376
 rectosacral, i, 386
 recto-urethral, i, 382. See also *Recto-
 urethral fistula*.
 rectovaginal, i, 373
 Gant's method of closing, i, 375
 rectovesical, i, 376. See also *Rectovesical
 fistula*.
 rectovulvar, i, 376
 sacrococcygeal, i, 178
 scissors, probe-pointed, Gant's, i, 342
 submucous, i, 389
 submucocutaneous, i, 391
 tubercular, 394. See also *Tubercular fis-
 tula*.
- Fistulectomy for anorectal fistula, i, 360
Fistulotomy in anorectal fistula, i, 346
Fixed rectum, i, 14
Flagellate colitis, iii, 14
Flagellates, iii, 14
Flatulence and tympanites in diagnosis of
 anorectal diseases, i, 51
 diagnostic significance of, ii, 457
 in anal fissure, i, 234
 relief of, i, 242
Flatus of intestinal tract, ii, 448
Flexure, hepatic, ii, 431
 sigmoid, ii, 432
Flora, intestinal, in colonic infections and
 other disturbances, changing of, iii, 392
Fluke-worm infection, iii, 35
Fluoroscopic examinations, i, 68
Focal infection, rectocolonic, and its relation
 to systemic diseases, iii, 117
 diagnosis, iii, 117
- Focal infection, rectocolonic, and its relation
 to sytemic diseases, general
 remarks, iii, 117
 serum and vaccine therapy in,
 iii, 120
 treatment, iii, 120, 121
- Follicular abscesses of anorectal region, i, 287
 anorectal ulceration, ii, 71
 enteritis, ii, 517
- Fomentations, hot, in spastic constipation,
 iii, 199
- Food poisoning, iii, 82
- Forceps, i, 112
 artery, i, 342
 dressing, i, 79, 81
 hemorrhoidal, Gant's, i, 504
 pressure, with detachable handles, Gant's,
 ii, 272
 tissue, i, 79, 81
- Forcible divulsion in anorectal stricture, ii,
 229
 in malignant growths of anorectal region,
 ii, 334
- Foregut, i, 1
- Foreign bodies as cause of chronic rectal ob-
 stipation, iii, 245
 of sphincteralgia, i, 222
 causing anorectal hemorrhage, ii, 2
 in colon, sigmoid flexure, and rectum, ii,
 474
 comment on Gant's cases, ii, 491
 complications, ii, 485
 diagnosis, ii, 485
 formed within intestine and
 other organs, ii, 480
 introduced as method of pun-
 ishment, ii, 478
 by practical jokers and indi-
 viduals seeking revenge, ii,
 477
 during examination or treat-
 ment, ii, 478
 for purposes of concealment,
 ii, 477
 through anus, ii, 476
 violent injuries, ii, 481
 to excite sexual passion, ii,
 480
 with murderous or suicidal
 intent, ii, 478
 objective signs and symptoms,
 ii, 485

- Foreign bodies in colon, sigmoid flexure, and rectum, points of most difficult passage, ii, 474
 prognosis, ii, 491
 reaching intestine by way of abdomen or other viscera, ii, 480
 symptoms, ii, 483
 that have been swallowed, ii, 474
 treatment, ii, 487
 in rectum in childhood, iii, 454
 removed from small intestine, colon, and rectum, ii, 482
- Fossa, intersigmoid, ii, 433
- Fossæ, ischiorectal, i, 39, 40
 pericecal, ii, 429
- Fountain syringe, i, 82; ii, 97
- Fovea, sacrococcygeal, i, 178
- Fowler's operation for procidentia recti, ii, 56
- Fractures, sacrococcygeal, i, 165
- Frequent desire to stool in diagnosis of anorectal diseases, i, 49
- Friction in atonic constipation, iii, 202
- Fulguration for anal fissure, i, 259
 for closing appendicostomy and cecostomy openings, iii, 388
 for non-malignant growths of anorectal region, ii, 274
 in anorectal ulceration, ii, 101
 in chronic catarrhal proctitis, i, 275
 in tuberculosis of intestines, iii, 65
- Fulness and uncasiness, abdominal sensations of, diagnostic significance of, ii, 457
 and weight in rectum in anorectal malignant disease, ii, 320
- Funnel and tube for administering medicated enemata, ii, 97
 for high colonic enemata, ii, 332
 pitcher and funnel proctoscope, Gant's, ii, 543
- Funnel-shaped anus, 1, 38; ii, 203
 in diagnosis of anorectal diseases, i, 50
- Furuncles of anorectal region, i, 287, 288
- Furunculosis, ii, 140
- GALL-STONES, ii, 496
- Galvanic current in atonic constipation, iii, 209
- Galvanofaradic current in atonic constipation, iii, 209
- Gangrene of rectum complicating rectal excision, ii, 360
- Gangrenous abscess, i, 309
 anorectal ulceration and abscess, ii, 66
 ordinary ulceration and, differentiation, ii, 68
- Gant's angular grooved director, i, 358
 anoscopes, i, 75, 77
 anteroposterior proctoplasty in procidentia recti, ii, 45
 appendicostomy, iii, 380
 where his irrigator is employed, iii, 383
 ascending anal douche, i, 473
 blunt-pointed anorectal knife, i, 247
 buttonhole pruritus ani operation, advantages of, ii, 132
 card-index history chart, i, 55
 cases of anorectal gas, mucous, and fecal cysts, ii, 281
 cecostomy, ileocecostomy, with an arrangement for irrigating small intestine and colon, iii, 372
 clamp and cautery operation for internal hemorrhoids, i, 514-516
 operation for closing colostomy opening, iii, 434
 valvotomy, iii, 290
 coccygectomy hook, i, 167
 colectomy, iii, 354
 colostomy clamp, iii, 414
 combined, cuff, plicating, and sigmoidopexy operation for procidentia recti et sigmoidæ, ii, 50
 operation in procidentia sigmoidæ, ii, 47
 curved fenestrated grooved director and knife, i, 355
 division operation for anal fissure, i, 247
 dumbbell-shaped soft-rubber bag, iii, 416
 electric cabinet, iii, 210
 excision operation for anal fissure, i, 256, 258
 in procidentia sigmoidæ, ii, 52
 fecal reservoir, soft-rubber, ii, 395, 396, 416
 firm steel fistula retractor and probes, i, 362
 fissure scissors, i, 249
 funnel pitcher and funnel proctoscope, ii, 543
 gauze packer, ii, 13
 goose-neck attachment for metal syringe, i, 111
 hemorrhoidal clamp, i, 515, 517
 forceps, i, 504

- Gant's history book, i, 56
- inflatable bag, ii, 392
- for extruding hemorrhoids, i, 463
- method of controlling hemorrhage in lower rectum, ii, 19
- lead clip, ii, 399, 401
- ligature operation for internal hemorrhoids, i, 504-512
- local anesthesia fistulectomy, i, 363, 364
- ligature operation in procidentia ani, ii, 39
- operation for anal stricture resulting from Whitehead's operation, i, 526
- for blind internal fistula, i, 359
- performed when mucosa has been sutured too far outside anal margin in Whitehead's operation, i, 525
- metal tractor for proctectomy operations, ii, 387
- method of closing rectovaginal fistula, i, 375
- of excising rectal diverticulum, ii, 290
- of freeing mucosa of anal canal and excising chronic ulcers, ii, 104
- of handling bowel ends when sphincter is preserved, ii, 380
- of lessening or preventing incontinence following proctectomy, ii, 377
- of retaining catheters in position with adhesive strips, iii, 375
- of retracting scrotum in anorectal operations, i, 494
- of through-and-through colonic irrigation, iii, 392
- modification of Darmac's gauze carrier for introducing stypticized gauze into rectum, ii, 11
- needle for anorectal operation, ii, 421
- ointment applicator, i, 217
- operating harness for holding dressings in place, ii, 13
- speculum, ii, 229
- operation for fecal incontinence, i, 411-413
- posterior proctoplasty in procidentia recti, ii, 43
- pressure forceps having detachable handles, ii, 272
- probe-pointed cannula for irrigating sinuses and injecting fistulae with Beck's paste, i, 337
- fistula scissors, i, 342
- probes, i, 80
- Gant's proctoplasty for anorectal stricture, ii, 232-234
- pyramidal-shaped compress for arresting anorectal hemorrhage, ii, 12
- gauze compress, i, 511
- rectal evacuator, ii, 11
- rectocolonic ointment applicator, ii, 224
- safety-pin retractor, i, 362
- sausage-shaped cloth bag for arresting anorectal hemorrhage, ii, 17, 19
- scissors operation for anal fissure, i, 249, 250
- self-retaining anal irrigator, iii, 391
- anoscope, i, 89
- simple stab-wound appendicostomy, iii, 381
- simplified local anesthesia buttonhole operation for pruritus ani, ii, 131
- small glass goose-neck syringe, i, 490
- soft-rubber enterocolonic irrigator, iii, 376
- in position, iii, 377
- fecal reservoir, ii, 236; iii, 417
- speculum, i, 75, 76
- splitting anal canal and sphincter operation, i, 248
- sponge method of controlling idiopathic and postoperative hemorrhage, ii, 17, 18
- spring stricture dilator, ii, 227
- stab-wound cecostomy, iii, 380
- steel safety-pin, ii, 384
- straight and curved steel and flexible grooved directors, i, 340
- synopsis of 7 cases of abdominal colonic and sigmoidal diverticula, iii, 158
- table of collected cases showing frequency of primary tuberculosis, iii, 45
- with which intestinal complicates tuberculosis elsewhere, iii, 45
- technic for injecting hemorrhoids with carbolic acid, i, 486
- in abdomino-anal, abdominoperineal, abdominosacral, and abdominovaginal excision, ii, 418
- in ligature operation for anorectal fistula, i, 366
- of anesthetizing skin and anal canal in Whitehead's operation for hemorrhoids, i, 519
- of closing recto-urethral fistula, i, 385
- of inferior proctectomy when sphincter is preserved, ii, 392
- is sacrificed, ii, 384

- Gant's technic of linear excision operation, i, 527, 528
 of performing Whitehead's operation for hemorrhoids, i, 520, 521
 of rectal extirpation, ii, 345
 of vaginal proctectomy, ii, 409
 two-stage proctectomy operation, ii, 404
 two-way irrigating proctoscope, iii, 10
 vaginal colostomy, iii, 419
 technic, iii, 420
 valve clamp, ii, 270, 273
 proctotomy in anorectal stricture, ii, 234
 valvotomy instruments, iii, 289
 water-tight tractor bag, ii, 402
 wire operation in procidentia recti, ii, 46
- Gas cysts of anorectal region, ii, 279
 case histories, ii, 281-285
 diagnosis, ii, 280
 symptoms, ii, 280
 treatment, ii, 281
 of colon and sigmoid flexure, iii, 327
 distention in anorectal malignant growths, ii, 321
 laughing-, as anesthetic, i, 98
- Gas-oxygen anesthesia, i, 97
- Gas-pipe intestine, ii, 78; iii, 52, 58
 rectum, ii, 149, 158, 191, 211
- Gastrogenic diarrhea, iii, 91
 symptoms and diagnosis, iii, 91
 treatment, iii, 92
- Gastro-intestinal canal, physiology of, ii, 441
 colonic, and rectal disturbances from bone diseases, iii, 91
 from brain and spinal cord diseases, iii, 91
 from diseases of nervous system, iii, 94
 of small intestine, iii, 93
 of stomach, iii, 91
 from eye abnormalities, iii, 89
 from genital affections, iii, 90
 from hepatic diseases, iii, 90
 from kidney lesions, iii, 90
 from mouth affections, iii, 89
 from nasopharyngeal diseases, iii, 89
 from pancreatic disturbances, iii, 90
 from skin diseases, iii, 90
 from suprarenal disease, iii, 90
 from thyroid disease, iii, 89
 toxic disturbances, iii, 82
 tract, developmental history of, i, 8
- Gastropexy in procidentia recti complicated by splachnoptosis, ii, 52
- Gauze compress, pyramidal-shaped, Gant's, i, 511
 pack, method of introducing through proctoscope, ii, 14
 packer, Gant's, ii, 13
- Gelatinoid cancer, ii, 310
- General anesthesia, i, 97. See also *Anesthesia, general*.
- Genital affections inducing enterocolonic disturbances, iii, 90
- Genito-urinary disease, manifestations of, in anorectal diseases, i, 94
- Genupectoral position for proctoscopy, i, 71, 72, 86
- Gersuny's method in fecal incontinence operation, i, 414
 operation for procidentia sigmoidæ, ii, 56
 technic of rectal extirpation, ii, 345
- Giant-celled sarcoma, ii, 315
- Gibson's cecostomy, iii, 379
- Girdle ulcers, iii, 48
- Gland, Luschka's, i, 41
- Glanders, iii, 115
- Glands of alimentary canal, development of, i, 8
 of Brunner, i, 9
 of intestines, development of, i, 8
 of Lieberkühn, i, 9
 of stomach, development of, i, 8
- Glandular cysts of anorectal region, ii, 261
 tuberculosis of intestines, iii, 52
- Glans penis, rectum opening through, in imperforate anus, i, 147
- Glass, magnifying, i, 82
 vs. metal syringe, i, 112
- Glomeruli arteriosi coccygei, i, 42
 diseases and tumors of, i, 176
- Glover's or whip-stitch sutures, iii, 359
- Gonococcus of Neisser, iii, 80
- Gonorrhea, ii, 179
 diagnosis, ii, 180
 symptoms, ii, 180
 treatment, ii, 180
- Gonorrheal colitis and sigmoiditis, iii, 79
 diagnosis, iii, 81
 pathology, iii, 80
 symptoms, iii, 80
 treatment, iii, 81
 proctitis, i, 278; ii, 179
 stricture, anorectal, ii, 214

- Gonorrheal ulcers of anorectal region, ii, 89
- Gorget, i, 343
wooden, i, 356
- Gout and rheumatism, iii, 140
- Gouty diarrhea, iii, 106
- Greater omentum, i, 5
- Grooved directors, i, 341
- Gumma of anorectal region, ii, 259
of colon and sigmoid flexure, iii, 78
treatment, iii, 78
syphilitic, ii, 196
- Gummatous deposits in anorectal stricture, ii, 217
- Gurgling and splashing sounds, diagnostic significance of, ii, 461
- Gut, fore, i, 1
hind, i, 1
mid, i, 1
postanal, i, 6
removing of, anesthetizing method in, i, 115
tract, i, 1
development of, i, 1
- HAIR cysts, i, 387
- Hairy concretions, ii, 496
- Halsted mattress suture, iii, 361
- Hand, introduction of, into rectum, i, 85
- Hane's table, i, 74
- Hard cancer, ii, 309
- Hard-rubber pistonbaby enema syringe, iii, 197
- Harness, operating, for holding dressings in place, Gant's, ii, 13
- Headache in diagnosis of anorectal diseases, i, 53
- Healing, delayed, postoperative, i, 540
- Heat and sunstrokes, diarrhea from, iii, 101
- Helminthiasis, iii, 19
symptoms, ii, 88
- Helminthic diseases, iii, 19
ulceration, rectocolonic, ii, 88
- Helminths, iii, 19
as cause of chronic obstipation, iii, 243
- Hemachromatosis, iii, 86
etiopathology, iii, 87
rectocolonic, iii, 86
treatment, iii, 87
- Hematemesis, iii, 123
- Hematuria, endemic, symptoms, iii, 36
- Hemesis as local anesthetic, i, 116
- Hemophilia, iii, 131
- Hemoptysis, iii, 123
- Hemorrhage following general anesthesia, i, 99
from hemorrhoids, preventing and controlling, i, 476
in anal fissure, i, 232
in anorectal malignant disease, ii, 321
ulceration, ii, 92
wounds and injuries, i, 196
in diagnosis of anorectal disease, i, 46
of rectum and anus, ii, 1. See also *Anorectal hemorrhage*.
of stomach, intestines, and colon, iii, 123
diagnosis, iii, 126
etiology, iii, 124
prognosis, iii, 131
surgical treatment, iii, 129
symptoms, iii, 125
treatment, iii, 128
- postoperative, arterial, i, 537
external, i, 537
Gant's method of controlling, i, 538
in hemorrhoid operations, i, 536
internal, i, 537
invisible, i, 537
late, i, 537
primary, i, 537
recurrent, i, 537
secondary, i, 537
symptoms, i, 537
venous, i, 537
visible, i, 537
- Hemorrhagic colitis, iii, 39
diagnosis, iii, 40
pathology, iii, 39
symptoms, iii, 40
treatment, iii, 41
surgical, iii, 41
- proctitis causing anorectal hemorrhage, ii, 4
- Hemorrhoidal anorectal ulceration, ii, 71
artery, inferior, i, 26
middle, i, 25
superior, i, 24; ii, 436
clamp, Gant's, i, 515, 517
forceps, Gant's, i, 504
operations causing fecal incontinence, i, 406, 407
plexus, i, 26, 425
stricture, anorectal, ii, 217
vein, inferior external, i, 28
middle, i, 27
superior, i, 27

- Hemorrhoids, i, 419
 anal fissure and, differentiation, i, 238
 anorectal, procidentia recti and, differential diagnosis, ii, 31, 32
 as cause of chronic rectal obstipation, iii, 245
 classification, i, 429
 color, i, 421
 consistence, i, 421
 definition, i, 419
 etiology, i, 421
 exciting causes, i, 426
 external, i, 430
 classification, i, 430
 cutaneous, i, 439
 etiopathology, i, 440
 symptoms, i, 441
 treatment, surgical, i, 441
 thrombotic, i, 222, 430
 diagnosis, i, 433
 etiology, i, 430
 pathology, i, 431
 surgical treatment, i, 435
 symptoms, i, 433
 treatment, i, 433
 excision operation, i, 438
 incision operation for, i, 436
 palliative, i, 434
 prophylactic, i, 433
 varicose, i, 438
 treatment, i, 439
 externo-internal, i, 445. See also *Hemorrhoids, internal, varicose*.
 form, i, 420
 general remarks, i, 420
 historic note, i, 419
 in childhood, iii, 448
 inflamed cutaneous, i, 222
 internal, i, 444
 as cause of anorectal abscess, i, 282
 capillary, i, 446
 treatment, i, 447
 causing anorectal hemorrhage, ii, 3
 classification, i, 445
 pathology, i, 445
 protruding, as cause of sphincteralgia, i, 222
 thrombotic, i, 445
 treatment, i, 446
 varicose, i, 450
 carbolic acid, quinin and urea for injection treatment of, i, 482
- Hemorrhoids, internal, varicose, complications, i, 460
 diagnosis, i, 460
 differential, i, 464
 diseases simulating, differentiation, i, 464
 etiology, i, 452
 hemorrhage from, preventing and controlling, i, 476
 injection treatment, i, 482
 pathology, i, 453
 prognosis, i, 468
 prolapsed, technic of returning, i, 475
 symptoms, i, 457
 treatment, division of sphincter, i, 480
 injection, i, 482
 complications, i, 484
 composition of solutions used in, i, 487
 mortality and prognosis, i, 484
 postoperative, i, 489
 rules for, i, 485
 non-operative and surgical palliative procedures, i, 478
 palliative, i, 470
 application of chemical caustics, i, 478
 cauterization in, i, 479
 crushing in, i, 481
 division of sphincter in, i, 480
 écrasement in, i, 479
 electrolysis in, i, 479
 submucous ligation in, i, 481
 torsion in, i, 481
 preventive, i, 470
 surgical, i, 491
 anesthesia for, i, 494
 bringing hemorrhoids down for operation, method, i, 498
 clamp and cautery operation in, i, 513
 classification, operations for, i, 502
 division and divulsion of sphincter in, i, 499
 excision operation for, i, 518
 general remarks, i, 491
 ligature operation, i, 503
 linear excision in, i, 526
 mortality, i, 529
 position of patient for, i, 494
 preparation of patient for, i, 493
 prognosis, i, 529

- Hemorrhoids, internal, varicose, treatment, surgical, unfavorable conditions for, i, 492
venous, i, 445, 450. See *Hemorrhoids, internal varicose*.
interno-external, i, 448
treatment, i, 450
location, i, 420
mixed, i, 448
treatment, i, 450
nevoid, i, 446
number, i, 420
postoperative confinement and convalescence, i, 532
hemorrhage, i, 536
pain in, i, 534
sphincteralgia and contractions of levator ani muscle, i, 534
symptoms and complications, i, 533
temporary and permanent sequelæ, i, 533
treatment of symptoms, complications, and sequelæ, i, 531
predisposing causes, i, 421
procidentia recti, and polyps, differential diagnosis, i, 468
sentinel, i, 228, 231
size, i, 421
strawberry, i, 446
technic for anesthetizing, i, 112
thrombotic, as cause of anorectal abscess, i, 282
usual site of, i, 26
- Hepatic abscess, diagnostic significance of, ii, 458
disturbances inducing enterocolonic manifestations, iii, 90
flexure, ii, 431
- Hereditary tendency in etiology of cancer, ii, 296
- Hernia as cause of chronic obstipation, iii, 235
resulting from colostomy treatment, iii, 419
umbilical, congenital, i, 2
- Herpes of perianal region, ii, 138
- High coal-oil enemata in amebic colitis, ii, 543
- Hill diarrhea, iii, 114
- Hilton's white line, i, 7
- Hind gut, i, 1
- Hirschmann's dilator for dilating rectum, iii, 288
- Hirschsprung's disease, i, 10; iii, 292
appearance of bowel in, iii, 295
as cause of chronic obstipation, iii, 236
- Hirschsprung's disease, diagnosis, iii, 299
dilatation of colon simulating, Magoun's classification of, iii, 292
etiopathology, iii, 292
non-operative treatment, iii, 300
surgical treatment, iii, 275, 301
symptoms, iii, 297
treatment, iii, 300
- History chart, card-index, Gant's, i, 55
taking, i, 55
- Hitch-stitch suture, iii, 359
- Hochenegg's method of handling bowel ends when sphincter is preserved, ii, 380
pull-through method in inferior proctectomy with preservation of sphincter, ii, 396
technic of rectal extirpation, ii, 345
- Holmes' classification of sacrococcygeal tumors, i, 168
- Hook, coccygectomy, Gant's, i, 167
- Hookworm disease, iii, 23
- Horner's pockets, i, 18
- Horny cancer, ii, 303
- Horseshoe anorectal fistula, i, 322
fistulæ, i, 40
- Hospital preparation of patient for surgical treatment, ii, 349
- Hot fomentations in spastic constipation, iii, 199
irrigants, iii, 390
- Houses, cancer, ii, 298
- Houston's valves, i, 13, 20
- Hydriatic electrode, iii, 311
- Hydrobilirubin, ii, 443
- Hydrocephalus, i, 155
- Hydrochloric acid, ii, 441
- Hydrotherapy in chronic atonic constipation, iii, 195
external, iii, 199
internal, iii, 196
enterocolitis and colitis, ii, 521
- Hyperesthesia, rectal, iii, 137
- Hyperperistalsis causing nervous diarrhea, iii, 95
- Hyperplastic tubercular stricture of rectum, ii, 211
ulceration, anorectal, ii, 76
tuberculosis of intestines, iii, 49
diagnosis, iii, 60
symptoms, iii, 56
- Hypersensitive areas in sigmoid flexure and rectum causing desire to stool, iii, 96

- Hypertrichosis of anus, ii, 139
- Hypertrophic catarrhal proctitis, i, 266
 enteritis, ii, 517
 excrescences in diagnosis of anorectal diseases, i, 51
 tuberculosis of upper rectum, ii, 147
 symptoms, ii, 156
- Hypertrophied anal papillæ, i, 205. See also *Papillitis*.
 papilla of anorectal region, ii, 259
 rectal valves as cause of chronic rectal obstipation, iii, 244
 in childhood, iii, 454
- Hypertrophy and irritability of levator ani muscle in diagnosis of anorectal diseases, i, 50
 of levator ani muscle as cause of chronic rectal obstipation, iii, 245
 of O'Beirne's sphincter as cause of chronic obstipation, iii, 243
 of sphincter ani as cause of chronic rectal obstipation, iii, 245
- Hypo-absorption causing nervous diarrhea, iii, 95
- Hypoblast, i, 5
- Hypodynamia cordis, diarrhea in, iii, 100
- Hyponarcosis, preliminary, i, 99
- Hysterectomy with resection in malignant growths of anorectal region, ii, 344
- Hysteria, digestive, iii, 140
- Hysteric rectum, iii, 95, 135
- IDIOPATHIC dilatation of colon and sigmoid flexure, congenital, iii, 292. See also *Hirschsprung's disease*.
- Ileitis, ii, 515
- Ileocecal adenopathy in tuberculosis of intestine, colon, and sigmoid flexure, iii, 51
 angle resection, cecostomy, iii, 351, 352
 fossa, ii, 429
 hyperplastic tuberculosis, cancer and, Gant's differential diagnosis, iii, 61
 valve, ii, 429
 incompetence, Kellogg's operation for restoring, iii, 266-268
 incompetency as cause of chronic obstipation, iii, 226
 purpose of, ii, 430
- Ileocecostomy and cecostomy in malignant growths of colon and sigmoid flexure, iii, 343
- Ileocecostomy and cecostomy, Gant's, with an arrangement for irrigating the small intestine and colon, iii, 372
 Gant's, and cecostomy, advantages of, iii, 369
 general remarks, iii, 366
 history, iii, 365
 in catarrhal enterocolitis, ii, 524
 in tuberculosis of intestines, iii, 66
- Ileocolic artery, ii, 436
 fossa, ii, 429
- Ileostomy, iii, 394
 and colostomy in tuberculosis of intestines, iii, 70
 in non-malignant growths of anorectal region, ii, 278
- Ileum, ii, 426
- Ileus, paralytic, ii, 467
 from coprostasis, iii, 306
- Iliac arteries, internal, i, 24
 colostomy, iii, 407
- Impaction, fecal, iii, 304. See also *Fecal impaction*.
- Imperforate anus, i, 7, 128
 mortality from different operations for, i, 153
 rectum opening into bladder, i, 146
 into urethra, i, 147, 148
 into uterus, i, 148
 into vagina, i, 144
 on surface, i, 150
 through glans penis, i, 147
 terminating at perineoserotol juncture, operation for, i, 135-137
 at sacral end, coccyx congenitally absent, i, 134, 149
 in blind pouch, operation for, i, 138, 139
 rectum, i, 139
 with spinal outlet, i, 128
- Inability to introduce finger, sigmoidoscope, or colon tube, diagnostic significance of, ii, 462
- Incised wounds of anorectal region, i, 194
- Incision operation in anorectal fistula, i, 346
- Incontinence, fecal, i, 29; iii, 137. See also *Fecal incontinence*.
 of adults and children, i, 400. See also *Fecal incontinence*.
 urinary, following anorectal wounds, i, 197
- Indian in urine, i, 64
- Indigestion, iii, 94

- Indurated areas in diagnosis of anorectal diseases, i, 48
- Infancy and childhood, colonic, sigmoidal, rectal, and anal diseases of, iii, 441
- Infection, cestodic, iii, 20
 fluke-worm, iii, 35
 focal, of colon, sigmoid flexure, and rectum, relation to systemic diseases, iii, 117
 following hemorrhoid operation, i, 541
 mixed, colitis, iii, 18
 intestinal, diagnostic significance of, ii, 458
 nematodic, iii, 22
 pin-worm, iii, 29
 rectocolonic, amebic, ii, 81
 round-worm, iii, 22
 seat-worm, iii, 29
 tapeworm, iii, 20
 thread-worm, iii, 29
 trematodic, iii, 35
 whip-worm, iii, 33
- Infectious diseases, acute, diarrhea in, iii, 109
 specific proctitis, i, 277
 treatment, i, 278
- Inferior mesenteric artery, ii, 436
 proctectomy in malignant growths of anorectal region, ii, 383
 when sphincter is sacrificed, Gant's technic, ii, 384
 with preservation of sphincter, ii, 391
- Infiltration anesthesia, i, 98, 106
- Inflamed crypts in childhood, iii, 450
 cutaneous hemorrhoids, i, 222
- Inflammation and discoloration of perianal skin in diagnosis of anorectal diseases, i, 50
- Inflammatory stricture, anorectal, ii, 210
 tumors of anorectal region, ii, 257
 of colon and sigmoid flexure, iii, 322
- Inflatable bag for distending rectum and controlling hemorrhage, ii, 19
 Gant's, ii, 392
- Inflating and irrigating rectal tube, Strauss', i, 62
- Inflation, i, 62
 in chronic atonic constipation, iii, 211
 of upper rectum, i, 13
 with palpation, i, 60
- Influenza, diarrhea in, iii, 109
- Infundibuliform anus in anal fissure, i, 233
- Infusoria, iii, 15
- Inguinal anus in rectovesical fistula, i, 381
 colostomy, iii, 407
- Inguinal lymph-nodes, enlargement of, diagnostic significance of, ii, 458
- Injection, oil, in anorectal ulceration, ii, 98
 treatment with carbolic acid, or quinin and urea for hemorrhoids, i, 482
- Injuries and wounds of abdomen, small intestine, colon, and sigmoid flexure, ii, 463
 anorectal, i, 191. See also *Anorectal wounds and injuries*.
 sacrococcygeal, i, 165
- Inspection in examination of patient, i, 57
 of perianal region, i, 58
- Instrumentation in chronic atonic constipation, iii, 210
- Instruments for examination of sigmoid flexure, rectum, and anus, i, 74
 for fistula operation, i, 341
 pneumatic, i, 89
 valvotomy, Gant's, iii, 289
- Insufflation in anorectal ulceration, ii, 98
- Intercourse, rectal, ii, 201
 unnatural, ii, 201
- Intermural abscess, i, 306
- Internal anorectal fistula, blind, i, 318
 complete, i, 320
 fistula, blind, i, 295
 hemorrhoids as cause of anorectal abscess, i, 282
 causing anorectal hemorrhage, ii, 3
 sphincter muscle, i, 16, 35
- Interposition operation in prolapsus uteri complicating procidentia recti, ii, 52
- Intersigmoid fossa, ii, 433
- Interstitial abscess, i, 308
- Intestinal auto-intoxication causing frequency of evacuation, iii, 96
 diagnostic significance of, ii, 456
 calculi, ii, 494, 498
 as cause of chronic rectal obstipation, iii, 245
 diagnosis, ii, 501
 symptoms, ii, 501
 synopsis of 54 cases, ii, 495
 treatment, ii, 502
- chromatosis, iii, 86
- duct, i, 2
- emphysema, iii, 327
- exclusion, iii, 422
 bilateral, iii, 429
 complete, iii, 428
 general remarks, iii, 422

- Intestinal exclusion in malignant growths of
 colon and sigmoid flexure, iii, 347
 in tuberculosis of intestines, iii, 68
 partial, iii, 428
 technic, iii, 428
 unilateral, iii, 429
 flora in colonic infections and other disturbances, changing of, iii, 392
 infection, mixed, diagnostic significance of, ii, 458
 movements, vermicular, diagnostic significance of, ii, 457
 myiasis, diarrhea from, iii, 115, 116
 obstruction, iii, 219. See also *Obstipation*.
 perforation, diagnostic significance of, ii, 457
 pneumatoses, iii, 327
 sand, ii, 494
 stasis, iii, 219. See also *Obstipation*.
 definition, iii, 173
 general remarks, iii, 173
 toxemia in diagnosis of anorectal diseases, i, 52
 tract, flatus of, ii, 448
 tube, long-jointed, Einhorn's, ii, 519
- Intestine, congenital and acquired abnormalities and displacements of, i, 9
 gas-pipe, ii, 78; iii, 52, 58
 glands of, development of, i, 8
 large, i, 4
 anatomy of, ii, 427
 antiperistaltic waves of, ii, 445
 cancer of, x-ray findings in, iii, 341
 movements of, ii, 445
 mesentery of, i, 4, 5
 small, anatomy of, ii, 426
 development of, i, 2, 4
 diseases of, inducing enterocolonic disturbances, iii, 93
 diverticula of, iii, 155
 dorsal mesentery of, i, 2
 embryology of, i, 1, 2
 examination and diagnosis of, i, 54
 hemorrhage of, iii, 123
 loops of, i, 4
 malignant growths of, iii, 330
 symptoms, iii, 331
 movements of, ii, 444
 peristaltic action of, ii, 444
 sensibility of, ii, 454
 ventral mesentery of, i, 2
 wounds and injuries of, ii, 463. See also
Wounds of abdominal viscera.
- Intestine, tuberculosis of, iii, 43. See also
Tuberculosis of intestine.
 villi of, development of, i, 8
- Intussusception and invagination as cause of chronic obstipation, iii, 235
- Invagination and intussusception as cause of chronic obstipation, iii, 235
 of sigmoid flexure into rectum causing anorectal hemorrhage, ii, 6
 rectal, in malignant growths of anorectal region, ii, 323
- Inverted position for proctosigmoidoscopic examination, i, 72, 73, 86
- Ionic medication in pruritus ani from Streptococci fecalis infection, ii, 127
- Ipecacuanha and emetin and amebic colitis, ii, 538
- Irregularities in living, diarrhea from, iii, 99
- Irrigating apparatus, i, 82
 for catarrhal enterocolitis, ii, 522
 colon through Gant's appendical irrigator, method, iii, 385
 proctoscope, two-way, Gant's, iii, 10
 solutions, iii, 389
 amount, iii, 391
 hot, iii, 390
- Irrigation, colonic, through-and-through, Gant's method, iii, 392
 in anorectal ulceration, ii, 97
- Irrigator, anal, self-retaining, Gant's, iii, 391
 Gant's soft-rubber enterocolonic, iii, 376
 in position, iii, 377
 Kemp, iii, 197
- Irritable rectum, iii, 135
- Irritability and hypertrophy of levator ani muscle in diagnosis of anorectal diseases, i, 50
- Irritative pruritus, ii, 108
- Ischiorectal abscesses, i, 293
 bilateral, i, 294
 diagnosis, i, 296
 symptoms, i, 296
 treatment, i, 298
 local anesthesia in, i, 299
 tubercular, i, 297
 fosse, i, 39, 40
- Isolating perianal region into quadrants, i, 57
- Itching at anus, ii, 105. See also *Pruritus ani*.
- JACKSON'S membrane as cause of chronic obstipation, iii, 238
- Jamison's seat syringe, ii, 226; iii, 182

- Jejunitis, ii, 515
 Jejunostomy, iii, 394
 Jejunum, ii, 426
 Joints, loose, backache due to, i, 184
 treatment, i, 187
 Junction, rectosigmoidal, ii, 434

 KEENE's technic of rectal extirpation, ii, 345
 Keith's table of anorectal deformities, i, 126
 Kellogg's operation for restoring competency
 of ileocecal valve, iii, 266-268
 Kelly's dilators, i, 82; iii, 311
 instruments, i, 79
 tubes, i, 76, 79
 Keloids in anorectal region, ii, 251
 Kemp irrigator, iii, 197
 Kidney lesions causing intestinal manifesta-
 tions, iii, 90
 Knee-chest position, exaggerated, ii, 325
 for proctoscopy, i, 71, 72, 86
 Knife and director, curved fenestrated
 grooved, Gant's, i, 355
 Knives, i, 342
 Kraske's operation, history and evolution of,
 ii, 342
 in malignant growths of anorectal region,
 ii, 342, 397
 mortality of, ii, 355
 Krause's table of melanotic sarcoma, ii, 318
 Krönlein's table of operative mortality in
 radical operations and excisions, ii, 354
 Kyger-Ball method of diminishing wound in
 hemorrhoid operation, i, 513

 LACERATED wounds of anorectal region, i, 191
 Laceration of perineum, complete, with fecal
 incontinence, operation for, i, 411
 Lamblia intestinalis, iii, 14
 Lane's kinks causing chronic obstipation, iii,
 229
 surgical treatment, iii, 270
 Lange's technic of rectal extirpation, ii, 345
 Laparotomy, exploratory, i, 85
 Large intestine. See also *Intestine, large*.
 Laughing-gas as anesthetic, i, 98
 Lavage, colonic, in diagnosis, i, 62
 medicated, in anorectal ulceration, ii, 97
 Lavatory seat, modified, position of body on,
 iii, 181
 Law's proctoscope, i, 76, 79
 Laxatives, diarrhea from, iii, 99
 for regulating stools in anal fissure, i, 242

 Lead-poisoning, iii, 84
 Left colic artery, ii, 437
 rectus colostomy, iii, 409
 Sims' position, ii, 325
 Lambert sutures, iii, 359
 Lesser omentum, i, 5
 Leukemic diarrhea, iii, 104
 Leukoderma, ii, 136
 Levator ani, i, 35
 contractions of, and sphincter algia fol-
 lowing hemorrhoid operations, i, 534
 function, i, 37
 hypertrophy and irritability of, as cause
 of chronic rectal obstipation, iii,
 245
 in diagnosis of anorectal diseases, i,
 50
 insertion of fibers, i, 36
 origin and distribution of muscle-fibers
 composing, i, 35
 Lieberkühn, crypts of, ii, 436
 glands of, i, 9, 17
 Lienteric diarrhea, iii, 91, 93
 Lifter of the anus, i, 35
 Ligature operation for anorectal fistula, i, 365
 Gant's technic, i, 366
 for internal varicose hemorrhoids, i, 503
 technic, i, 504
 for non-malignant growths of anorectal
 region, ii, 273
 under local anesthesia in procidentia ani,
 ii, 39
 Ligatures and sutures, failure of, to come
 out, postoperative, i, 540
 Linear cauterization for procidentia ani, ii,
 37
 excision operation, Gant's technic, i, 527,
 528
 in internal hemorrhoids, i, 526
 Linen, harness, vs. silk for sutures, i, 112
 Lipase, ii, 442
 Lipoma of anorectal region, ii, 253
 of colon and sigmoid flexure, iii, 322
 sacrococcygeal, i, 168
 Liquid air anesthesia, i, 104
 Lisfranc's operation, history and evolution of,
 ii, 342
 in malignant growths of anorectal region,
 ii, 383
 Lithotomy position, ii, 350
 elevated, ii, 350
 for anorectal examination, i, 70, 71, 86

- Liver and abdominal douche, iii, 202
- Local anesthesia, i, 106
- abdominal, i, 117, 119, 120
 - technic, i, 121
- anorectal and abdominal operations
- inoperable under, i, 110
 - operable under, i, 108
 - technic, i, 116
- aposthesine, i, 116
- apparatus for operations under, i, 111
- hemesia, i, 116
- in abdominal operations, i, 118
 - in anorectal operative treatment, i, 114
 - in palliative treatment of anorectal diseases, i, 113
 - in treatment of ischiorectal abscesses, i, 299
- quinin and urea hydrochlorid, i, 116
- simplified buttonhole operation for pruritus ani, Gant's, ii, 131
- sterile water and normal salt solution, i, 116
- anesthetics, i, 113
- Lock-stitch suture, iii, 359
- Locomotor ataxia, manifestations in anorectal region, i, 93
- Loss in weight, diagnostic significance of, ii, 460
- in diagnosis of anorectal diseases, i, 52
- Luetic and non-syphilitic condylomata, local anesthesia operation for, i, 109
- Lumbago, i, 183
- Lumbrieoid worms, iii, 25
- Lupoid ulceration, anorectal, ii, 80
- Lupus, ii, 142
- exedens, ii, 80, 172
 - of perianal skin and rectum, ii, 167
 - diagnosis, ii, 170
 - radical operation in, ii, 171
 - symptoms, ii, 169
 - treatment, ii, 170 - vulgaris serpiginosus, ii, 168
- Luschka's gland, i, 8, 41
- diseases and tumors of, i, 176
- Lye, ulceration of intestine from, ii, 467
- Lymphadenoma of anorectal region, ii, 257
- Lymphangiomata, sacrococeygeal, i, 168
- Lymphatics of anorectal region, i, 29
- surgical importance of, i, 32
 - of colon and sigmoid flexure, ii, 439
 - method of handling, in anorectal amputation and resection, ii, 363
- Lymphatics of neutral zone anal region, i, 30
- of perianal skin, i, 30
 - of rectovaginal septum, i, 32
 - of rectum, i, 29, 30
 - surgical importance of and methods of dealing with, in anorectal amputation and resection, ii, 370
- Lymph-nodes, inguinal, abdominal, sacral, enlargement of, diagnostic significance of, ii, 458
- Lymphosarcomata, ii, 318
- MacKENZIE's method in excision operation for anorectal fistula, i, 365
- Maggots, intestinal, diarrhea from, iii, 116
- Magnifying glass, i, 82
- Magoun's classification of dilatation of colon simulating Hirschsprung's disease, iii, 292
- Maidismus, iii, 108
- Malaria, iii, 115
- Malformations of anus, i, 128
- and rectum, i, 123
 - of coecyx, i, 159. See also *Coccyx, malformations*.
 - of colon and sigmoid flexure, ii, 504. See also *Colon and sigmoid flexure, malformations of*.
 - of rectum, i, 139
 - types of, i, 139
 - sacrococeygeal, i, 159
- Malformed stools in malignant growths of anorectal region, ii, 321
- Malignant adenoma, ii, 305
- and benign neoplasms as cause of chronic obstipation, iii, 236
 - growths of small intestine, colon, and sigmoid flexure, iii, 330
- Manifestations and diseases of anorectal region induced by extrarectal causes, i, 93
- and signs of anorectal diseases, i, 45
 - of disease involving colon and sigmoid flexure, ii, 455
 - pointing to anorectal diseases, diagnostic significance of, i, 44
- Manley's torsion operation for hemorrhoids, i, 481
- Marasmic diarrhea, iii, 105
- Marginal abscess, subcutaneous, of anorectal region, i, 290
- Markings, congenital, diagnostic significance of, ii, 458

- Martin's proctoscope, i, 78
 Massage, deep rotating colonic, technic, iii, 203
 in atonic constipation, iii, 201
 contraindication to, iii, 204
 rotary wheel, for constipation, iii, 208
 Masturbation, ii, 480
 rectal, ii, 205
 Matthews' operation for procidentia sigmoidæ, ii, 56
 Mattress suture, Halsted, iii, 361
 Mannsall, Weir, and Steinthal's method of handling bowel ends when sphincter is preserved, ii, 380
 Maunsell's mesenteric through-and-through stitch in circular enterorrhaphy, iii, 356
 Maylard's operation for procidentia recti, ii, 56
 Mayo-Balfour-Coffey technic in abdomino-perineal proctectomy, ii, 422
 McArthur's operation for procidentia sigmoidæ, ii, 56
 McBurney's method of appendectomy, iii, 146
 Meat poisoning, iii, 82
 Mechanical diarrhea, iii, 102
 Meckel's appendix, iii, 155
 diverticulitis, symptoms, iii, 171
 diverticulum, i, 2; iii, 170
 treatment, iii, 172
 Medicated lavage in anorectal ulceration, ii, 97
 Medicinal poisoning, iii, 84
 Medullary cancer, ii, 309
 Megacolon, congenital, iii, 292. See also *Hirschsprung's disease*.
 Meissner's plexus, i, 29; ii, 438
 Melancholia and nervousness in anal fissure, i, 234
 Melanotic cancer, ii, 312
 sarcoma, ii, 318
 Membrane, diphtheric, ii, 529, 531
 Membranes, complete occlusion of anus by, i, 132
 partial occlusion of anus and rectum by, i, 131
 Membranous enterocolitis, ii, 510; iii, 139
 obstruction of rectum, i, 141
 Meningitis, cerebrospinal, diarrhea in, iii, 106
 Meningocele, spinal, i, 155
 Mercurial ointments in anal fissures, i, 246
 poisoning, iii, 85
 Mesenteric abnormalities as cause of chronic obstipation, iii, 235
 artery, inferior, ii, 436
 cysts of colon and sigmoid flexure, iii, 326
 embolism and thrombosis, iii, 329
 Mesenteries and digestive tube in human fetus, stages in development of, i, 3
 Mesentery, ii, 439
 common, i, 4
 of intestine, i, 4, 5
 Meso-appendix, ii, 440
 Mesoblast, i, 4, 5
 Mesocecum, ii, 429
 Mesocolitis, iii, 154
 Mesocolon, i, 4; ii, 439
 cecal, ii, 440
 Mesoderm, i, 5, 8
 Mesogastrium, i, 2, 4
 Mesorectum, ii, 440
 Mesosigmoid, i, 4
 Mesosigmoiditis, iii, 154
 Metal vs. glass syringe, i, 112
 Metastasis in malignant growths of anorectal region, ii, 323
 Metchnikoff's *Bacillus bulgaricus* in ileocecal valve incompetence, iii, 266
 Meteorism, diagnostic significance of, ii, 461
 Microcolon, iii, 292
 Microscopic examination in malignant growths of anorectal region, ii, 327
 Micturition, difficult, following anorectal wounds, i, 197
 Mid gut, i, 1
 Middle colic artery, ii, 436
 Miliary tubercles in anal canal, ii, 79
 tuberculosis of intestines, iii, 52
 of upper rectum, ii, 150
 symptoms, ii, 157
 Milk cancer, ii, 309
 Miscellaneous concretions, ii, 500
 contagious, infectious, and tropical intestinal diseases, iii, 109
 Mitchell's injection treatment of hemorrhoids, i, 482
 Mixed infection colitis, iii, 18
 intestinal infection, diagnostic significance of, ii, 458
 Morestin's method of handling bowel ends when sphincter is preserved, ii, 380
 technic of rectal extirpation, ii, 345
 Morgagni, columns of, i, 17

- Morgagni, crypts of, i, 18
 anatomy, i, 212
 function, i, 213
- Morphin and scopolamin preliminary to
 abdominal local anesthesia, i, 121
 preliminary to anorectal local anesthesia
 operations, i, 117
- Mortality from different operations for im-
 perforate anus, i, 153
- Moschowitz's operation for procidentia sig-
 moidæ, ii, 56
- Mouth affections inducing rectocolonic dis-
 turbances, iii, 89
 examination of, i, 57
- Movable rectum, i, 13
- Movements of large intestine, ii, 445
 of small intestine, ii, 444
 vermicular intestinal, diagnostic signifi-
 cance of, ii, 457
- Mucoid cancer, ii, 310
- Mucosa and skin, excoriation of, in anal
 fissure, i, 233
- Mucous channels complicating proctitis, i, 391
 colic, ii, 210
 cysts, case reports, ii, 284, 285
 of anorectal region, ii, 279, 280
 case histories, ii, 281-285
 diagnosis, ii, 280
 symptoms, ii, 280
 treatment, ii, 281
 patches, ii, 187, 188
- Mucus, discharge of, diagnostic significance
 of, ii, 457
- Mucus-containing sinuses complicating pro-
 ctitis, i, 391
- Mucus-secreting goblet cells of rectum, i, 17
- Multilocular tubercular abscesses, i, 308
- Multiple adenoma of colon and sigmoid
 flexure, iii, 320
- Munson corrective corset, iii, 254
- Murphy button entero-anastomosis, iii, 424
- Muscarin, iii, 83
- Muscles, abnormal abdominal, diagnostic sig-
 nificance of, ii, 461
 coccygeus, i, 35
 of anorectal region, i, 33
 of anus, i, 33
 of rectum, i, 33
 rectococcygeus, i, 35
- Musculature, perineal, stages in evolution of,
 i, 5
- Mushroom-poisoning, iii, 83
- Myelomeningocele, i, 156
- Myelosarcoma, ii, 315
- Myiasis, intestinal, diarrhea from, iii, 116
- Myoma of anorectal region, ii, 254
 of colon and sigmoid flexure, iii, 322
- Myositis, i, 183
- Myotomy, submucocutaneous, for anal fis-
 sure, i, 253
- Myxoma of anorectal region, ii, 257
- Myxorrhæa coli, ii, 510; iii, 139
 as cause of chronic obstipation, iii, 230
 definition, ii, 510
 diagnosis, ii, 512
 etiology, ii, 511
 general remarks, ii, 510
 pathology, ii, 511
 prognosis, ii, 514
 symptoms, ii, 511
 treatment, ii, 513
 colica, ii, 510
 membranacea, ii, 510
- NARROWING of anal canal as cause of chronic
 rectal obstipation, iii, 245
 of anus, i, 129
 and rectum, local anesthesia operation
 for, i, 130
- Nasopharyngeal diseases inducing gastro-
 intestinal disturbances, iii, 89
- Nausea and vomiting, diagnostic significance
 of, ii, 460
 in diagnosis, i, 54
- Necator americanus, iii, 23
- Necrosis, coccygeal, i, 172
 sacrococcygeal, i, 172
- Needle, Gant's, for anorectal operations, ii,
 421
- Needles, i, 343
 shouldered, i, 490, 497
- Neisser, gonococcus of, iii, 80
- Nematodic infection, iii, 22
- Neoplasms as cause of anorectal abscesses, i,
 282
 tubercular, as cause of chronic obstipation,
 iii, 243
- Neoplastic stricture, anorectal, ii, 218
 tubercular tumor of anorectal region, ii, 258
 tuberculosis of intestines, iii, 49
 diagnosis, iii, 60
 symptoms, iii, 56
 of upper rectum, ii, 147
 symptoms, ii, 156

- Nephritis as contraindication to hemorrhoidal operations, i, 493
- chronic, manifestations of, in anorectal diseases, i, 94
- relation of focal infection of colon, sigmoid flexure, and rectum to, iii, 117
- Nerve blocking, i, 106
- supply of colon and sigmoid flexure, ii, 438
- Nerves of anorectal region, i, 29
- superficial, of anorectal region, i, 29
- Nervous system, diseases of, inducing enterocolonic disturbances, iii, 94
- Nervousness and melancholia in anal fissure, i, 234
- Neuralgia, rectal, iii, 135
- sacrococcygeal, i, 173. See also *Coccydinia*.
- Neurenteric canal, i, 1
- Neurogenic diarrhea, iii, 94
- diagnosis, iii, 96
- diagnostic significance of, ii, 461
- symptoms, iii, 96
- treatment, iii, 97
- disturbances, manifestations in anorectal region, i, 93
- Neuroses, rectocolonic, iii, 133. See also *Rectocolonic neuroses*.
- Nevi, pigmented, of buttocks, ii, 255
- New growths as cause of chronic rectal obstruction, iii, 244
- Nile's normalizer in atonic constipation, iii, 204
- Nitrous oxid anesthesia, i, 98
- contraindications, i, 98
- Nocturnal diarrhea, iii, 94
- Non-malignant growths involving rectosigmoidal juncture, rectum, and anus, ii, 238
- Non-syphilitic and luetic condylomata, local anesthesia operation for, i, 109
- perianal verrucae, ii, 197
- Non-tubercular fistula, tubercular and, differential diagnosis, i, 397
- Normal bowel and other organs, connection between, i, 149
- Nott's excision of coccyx, i, 164
- Novocain as anesthetic, i, 114
- Nyctotherus africanus, iii, 15
- faba, iii, 15
- giganteum, iii, 15
- Oat stones, ii, 497
- O'beirne's sphincter, hypertrophy of, as cause of chronic obstipation, iii, 243
- Obesity, diarrhea in, iii, 103
- Obstipation, iii, 219
- abdominal, in childhood, iii, 459
- acute, iii, 219
- diagnosis, iii, 220
- entero-anastomosis in, iii, 221
- etiology, iii, 219
- symptoms, iii, 220
- treatment, iii, 220
- anorectal, in childhood, iii, 458
- chronic, iii, 221
- abdominal, adhesions and contracting exudates in, iii, 228
- angulations and kinks in, iii, 229
- benign and malignant neoplasms in, iii, 236
- cecum mobile in, iii, 224
- chief factors causing, iii, 222
- colonic dilatation in, iii, 236
- congenital anomalies and displacements in, iii, 223
- diverticula in, iii, 243
- enterospasm in, iii, 243
- extra-intestinal pressure in, iii, 223
- foreign bodies, gall-stones, and enteroliths in, iii, 243
- helminths in, iii, 243
- hernia in, iii, 235
- Hirschsprung's disease in, iii, 236
- hypertrophy of O'Beirne's sphincter in, iii, 243
- ileocecal valve incompetency in, iii, 226
- invagination and intussusception in, iii, 235
- Jackson's membrane in, iii, 238
- mesenteric abnormalities in, iii, 235
- myxorrhoea coli in, iii, 230
- pericolitis and perisigmoiditis in, iii, 238
- stricture in, iii, 237
- surgical treatment of, iii, 256
- angulations and kinks, Lane's, iii, 270
- cecopexy, colopexy, and sigmoidopexy, iii, 259
- colectomy, cecectomy, and sigmoidectomy, iii, 283
- colonic elongation in, iii, 275
- colopexostomy in, iii, 265

- Obstipation, chronic, abdominal, surgical treatment of, colopexy with invagination in, iii, 264
- colostomy, iii, 285
- enterectomy in, iii, 283
- entero-anastomosis, iii, 282
- enterostomy, iii, 285
- in adhesions and tumefactions, iii, 269
- in benign and malignant growths, iii, 277
- in cecum mobile, iii, 266
- in colonic dilatation, iii, 275
- in diverticulitis, iii, 279
- in enterospasm, iii, 281
- in extra-intestinal pressure, iii, 257
- in foreign bodies and enteroliths, iii, 281
- in hernia, iii, 272
- in Hirschsprung's disease, iii, 275
- in hypertrophy of O'Beirne's sphincter, iii, 281
- in ileocecal valve incompetence, iii, 266
- in invagination, iii, 273
- of sigmoid flexure into rectum, iii, 275
- in Jackson's membranes, iii, 278
- in mesenteric abnormalities, iii, 273
- in pericolitis and perisigmoiditis, iii, 277
- in visceroptosis, iii, 258
- in volvulus, iii, 271
- intestinal exclusion in, iii, 265
- mesocolopexy in, iii, 264
- of helminths, iii, 281
- operations in, iii, 281
- phrenocolopexy, iii, 264
- resection in, iii, 265
- sigmoidopexy in, iii, 262
- strictures, iii, 277
- tubercular neoplasms in, iii, 243
- visceroptosis in, iii, 223
- volvulus in, iii, 230
- atonic constipation and, differential diagnosis, iii, 190
- diagnosis, iii, 248
- early symptoms, iii, 247
- end-results, iii, 248
- enema in diagnosis, iii, 456
- etiopathology, iii, 222
- Obstipation, chronic atonic, general remarks, iii, 221
- in children, iii, 455
- intermediary symptoms, iii, 247
- late symptoms, iii, 247
- rectal, iii, 243
- chief factors causing, iii, 243
- congenital deformities of rectum or anus in, iii, 244
- cryptitis as cause, iii, 245
- deviated coccyx as cause, iii, 245
- extrarectal pressure in, iii, 244
- fecal impaction causing, iii, 245
- fecoliths and enteroliths causing, iii, 245
- fissures and ulcers in, iii, 245
- foreign bodies as cause, iii, 245
- hemorrhoids as cause, iii, 245
- hypertrophied anal papillæ in, iii, 245
- rectal valves as cause, ii, 244
- hypertrophy of levator ani muscle in, iii, 245
- of sphincter ani in, iii, 245
- narrowing of anal canal in, iii, 245
- new growths causing, iii, 244
- proctentia recti and sigmoid invagination in, iii, 245
- stricture, anal, or rectal in, iii, 244
- surgical treatment, iii, 285
- congenital anomalies of rectum and anus, iii, 285
- in abscesses and fistulæ, iii, 288
- in cryptitis, iii, 291
- in deviation of coccyx, iii, 290
- in diverticulitis, iii, 287
- in extrarectal pressure, iii, 287
- in fecal impactions, iii, 291
- in fissures and ulcers, iii, 291
- in foreign bodies and enteroliths, iii, 289
- in hemorrhoids, iii, 291
- in hypertrophied anal papillæ, iii, 291
- rectal valves, iii, 288
- in hypertrophy of levator ani muscle, iii, 289
- of sphincter ani, iii, 290
- in imperforate anus with blind rectum, iii, 286
- with fecal fistula, iii, 287
- rectum with apparently normal anus, iii, 287

- Obstipation, chronic, rectal, surgical treatment, in malignant and large benign growths, iii, 288
in narrowing, cicatricial or muscular, of anal canal, iii, 290
of lower rectum, iii, 286
in obliteration of rectum or colonic segment, iii, 287
in proctidia recti, iii, 289
in proctitis and periproctitis, iii, 290
in strictures, iii, 288
of helminths, iii, 287
symptoms, iii, 246
treatment, iii, 253
 medical, iii, 253
 surgical, iii, 253
definition, iii, 173
general remarks, iii, 173
in childhood, iii, 455
 enema in diagnosis, iii, 456
- Obstruction, dynamic, iii, 219
in malignant growths of anorectal region, ii, 322
intestinal, iii, 219. See also *Obstipation*.
of rectum, membranous, i, 141
- Occlusion of anus and rectum, partial, by membranes or fibrous bands, i, 131
complete membranous, i, 132
- Odors in diagnosis of anorectal diseases, i, 49
in malignant growths of anorectal region, ii, 321
of stools in diagnosis, i, 64
- Oil injection in anorectal ulceration, ii, 98
- Oil-ether rectocolonic anesthesia, i, 99
- Ointment applicator, i, 217, 243
rectocolonic, Gant's, ii, 224
- Olive-tipped flexible sound and irrigator, iii, 249
- Omental bursæ, i, 5
cysts of colon and sigmoid flexure, iii, 328
- Omentum, greater, i, 5
lesser, i, 5
- Onanism, rectal, ii, 205, 480
- Openings in rectum or perianal skin in diagnosis of anorectal diseases, i, 49
- Operating harness for holding dressings in place, Gant's, ii, 13
speculum, Gant's, ii, 229
- Operations, anorectal fistula, classification of, i, 339
instruments for, i, 341
- Operations, anorectal fistula, preparation of patient for, i, 339
posture for, i, 111
under infiltration anesthesia, apparatus for, i, 111
- Operative treatment of anorectal diseases, anesthesia in, i, 114
- Opothrapy in catarrhal enterocolitis, ii, 523
- Organic diseases, resultant gastro-intestinal, colonic, and rectal disturbances, iii, 89
- Organotherapy in cancer, ii, 341
in catarrhal enterocolitis, ii, 523
- Ossifying cancer, ii, 312
- Osteo-integumentary flap operation, history and evolution of, ii, 343
in malignant growths of anorectal region, ii, 343
Rhen-Rydligier's, ii, 343
- Osteoma of anorectal region, ii, 257
- Overall's solution for injection treatment of internal hemorrhoids, i, 488
- Oxygen baths, colonic, in atonic constipation, iii, 209, 212
- Oxyuriasis, iii, 29
diagnosis, iii, 31
pathologic changes in, iii, 30
prognosis, iii, 31
symptoms, iii, 31
treatment, iii, 31
- Oxyuris vermicularis, iii, 29
as cause of pruritus ani, ii, 108
pruritus ani from, treatment, ii, 126
- PACK, gauze, method of introducing through proctoscope, ii, 14
- Paeker, gauze, Gant's, ii, 13
- Packing rectum with stypticized gauze for arresting bleeding from ulcers and oozing areas, ii, 10
- Pain and sticking or pricking sensation in diagnosis of anorectal diseases, i, 50
from lesions at anus, i, 29
in anal fissure, i, 232
in anorectal malignant disease, ii, 320
ulceration, ii, 91
in diagnosis of anorectal disease, i, 45
postoperative, in hemorrhoid operations, i, 534
- Painful ulcer, i, 227. See *Fissure in ano*.
- Palliative treatment of anorectal diseases, anesthesia in, i, 113

- Palpation in diagnosis of malignant growths
 of anorectal region, ii, 325
 in examination of patient, i, 59
 of rectum and perianal region, i, 60
 spinal, i, 61
 with inflation, i, 60
- Pancreatic calculi, ii, 500
 diarrhea, diagnosis, ii, 519
 disturbances inducing enterocolonic mani-
 festations, iii, 90
- Papillæ, anorectal, i, 18
 hypertrophic, i, 19, 205; ii, 259. See
 also *Papillitis*.
- Papillary angiomata in malignant growths of
 anorectal region, ii, 323
- Papillitis, i, 205
 anal fissure and, differentiation, i, 240
 associated conditions, i, 207
 diagnosis, i, 208
 etiology, i, 206
 general remarks, i, 205
 in anal fissure, i, 234
 in childhood, iii, 450
 in diagnosis of anorectal diseases, i, 50
 pathology, i, 206
 symptoms, i, 207
 treatment, i, 209
- Papilloma, ii, 188
 in diagnosis of anorectal diseases, i, 51
 of anorectal region, ii, 250
 mucous, ii, 250
 rectocolonic, ii, 250
- Papular syphilids of perianal skin, ii, 186, 188
- Paquelin cautery in anorectal fistula, i, 357
- Paralytic ileus, ii, 467
 from coprostasis, iii, 306
- Parasitic diseases, iii, 19
 tumor of anorectal region, ii, 260
- Paravertebral anesthesia, i, 102
- Partial proctectomy in malignant growths of
 anorectal region, ii, 424
- Pastes, caustic, in malignant growths of ano-
 rectal region, ii, 340
- Patches, mucous, ii, 187, 188
- Patient, position of, for examination in ma-
 lignant disease of anorectal region, ii,
 325
 for hemorrhoidal operations, i, 494
 for surgical treatment of malignant
 growths of anorectal region, ii, 350
 preparation of, for examination in malig-
 nant disease of anorectal region, ii, 325
- Patient, preparation of, for fistula operation,
 i, 339
 for hemorrhoidal operations, i, 493
- Patulous anus, i, 408
 following hemorrhoid operations, i, 526
- Pecten of Stroud, i, 7
- Pederast, active, ii, 203
 passive, ii, 203
 penis of, ii, 203
- Pederasty, ii, 201
 active, as non-pathologic phenomenon, ii,
 204
 as pathologic phenomenon, ii, 204
 different ways by which acquired, ii, 204
 diseases of anorectal region resulting from,
 ii, 205
 passive, as non-pathologic phenomenon, ii,
 204
 as pathologic phenomenon, ii, 204
 different ways by which acquired, ii, 204
 physical signs, ii, 202
- Pediculi as cause of pruritus ani, ii, 108
- Pellagra, iii, 108
- Pelvic colon, ii, 432
 fascia, i, 41
- Pelvirectal abscesses, i, 279, 297. See also
Anorectal abscesses.
 spaces, i, 39
- Pelvis, i, 42
 diameters, i, 42
 plan of dividing into quadrants, i, 57
- Pendulum movement of small intestine, ii,
 444
- Penetrating wounds of abdominal viscera, ii,
 465
 of anorectal region, i, 194
- Pepsin, ii, 441
- Percussion, i, 62
- Percy's slow-cooking procedure in malignant
 disease of anorectal region, ii, 339
- Perforating wounds of anorectal region, i,
 194
- Perforation and peritonitis in anorectal ulcer-
 ation, ii, 93
 in tuberculosis of intestines, iii, 56
 in malignant growths of anorectal region,
 ii, 322
 of intestinal organs, ii, 463
 diagnostic significance of, ii, 457
- Perianal abscesses, i, 279, 290. See also
Anorectal abscesses.
 erosions, ii, 188

- Perianal region and buttocks, skin affections
of, ii, 135
chancroids of, ii, 181
condylomata of, complicating chronic
hypertrophic proctitis, i, 270
gonorrhea of, ii, 179
herpes of, ii, 138
inspection of, i, 58
isolating into quadrants, i, 57
malignant growths of, ii, 293. See also
Anorectal region, malignant growths of.
palpation of, i, 60
papular syphilids of, ii, 186, 188
ringworm of, ii, 141
syphilis of, ii, 184
tuberculosis of, ii, 144. See also *Tuber-*
culosis of perianal region.
venereal diseases of, ii, 179
- skin, inflammation and discoloration of, in
diagnosis of anorectal diseases, i, 50
lupus of, ii, 167. See also *Lupus of peri-*
anal skin and rectum.
lymphatics of, i, 30
openings in, in diagnosis of anorectal
diseases, i, 49
tubercular ulcers, ii, 79
verruca, non-syphilitic, ii, 197
- Pericecal fossæ, ii, 429
- Pericolitis and perisigmoiditis as cause of
chronic obstipation, iii, 238
definition, iii, 150
diagnosis, iii, 153
etiology and pathology, iii, 150
gravis, iii, 152
pathology, i, 283
simplex, iii, 152
symptoms, iii, 152
treatment, iii, 153
- Peridiverticulitis, definition, iii, 155
of small intestine, cecum, colon, and sig-
moid flexure, iii, 155
- Perineal body, i, 7
female, i, 24
excision, history and evolution of, ii,
342
in malignant growths of anorectal region,
ii, 383
mortality of, ii, 355
fistula, i, 386
laceration, complete, with fecal inconti-
nence, operation for, i, 411
musculature, stages in evolution of, i, 5
- Perineal proctectomy, abdominal. indications
for, ii, 383
- Perineum, i, 7, 23
of female, i, 24
of male, i, 23
- Periproctitic abscesses, i, 279. See also
Anorectal abscesses.
- Periproctitis, i, 260, 279. See also *Anorectal*
abscesses.
pathology, i, 283
- Perirectal abscesses, i, 279. See also *Ano-*
rectal abscesses.
- Perisigmoiditis and pericolicitis as cause of
chronic obstipation, iii, 238
definition, iii, 150
diagnosis, iii, 153
etiology and pathology, iii, 150
symptoms, iii, 152
treatment, iii, 153
- Peristalsis, ii, 443
purpose of, ii, 444
- Peristaltic waves of small intestine, ii, 444
- Peritoneal slack, reduction of, in procidentia
sigmoideæ, ii, 51
tuberculosis of intestines, iii, 52
- Peritonitis and perforation in anorectal ulcer-
ation, ii, 93
chronic, in malignant growths of anorectal
region, ii, 321
local or general, diagnostic significance of,
ii, 457
tubercular, complicating intestinal tuber-
culosis, iii, 59
with perforation in tuberculosis of intes-
tines, iii, 56
- Permanent colostomy, iii, 404
- Pernicious anemia, diarrhea in, iii, 104
- Perron's method of handling bowel ends
when sphincter is preserved, ii, 380
- Perspiration in chronic catarrhal proctitis, i,
270
- Pétrissage in atonic constipation, iii, 202
technic, iii, 203
- Phagedenic anorectal ulceration, ii, 65
- Phantom stricture, anorectal, ii, 208
- Phlebosclerosis, i, 454
- Phlegmon, anorectal, ii, 66
- Phlegmonous abscess, i, 309
- Physiology of gastro-intestinal canal, ii, 441
- Pigmentation, rectocolonic, iii, 86
- Pigmented nevi of buttocks, ii, 255
- Piles. See *Hemorrhoids.*

- Pilonidal sinus, sacrococcygeal, i, 178
 Pin-worm infection, iii, 29
 pruritus ani from, treatment, ii, 126
 Pit, anal, i, 6
 Pitcher, funnel, and funnel proctoscope,
 Gant's, ii, 543
 Pityriasis rubra pilaris, ii, 136
 Plaguc, iii, 115
 Plaster binder, Rose, pattern for, iii, 257
 Plexus, Auerbach's, i, 29; ii, 438
 hemorrhoidal, i, 26
 Meissner's, ii, 438
 Pneumatic instruments, i, 89
 wounds of abdominal viscera, ii, 464
 of anorectal region, i, 194
 Pneumatosis, intestinal, iii, 327
 Pneumonia inducing gastro-intestinal dis-
 turbances, iii, 109
 Poisoning, acid, iii, 84
 arsenic, iii, 84
 chemical, iii, 85
 fish, iii, 82
 lead, iii, 84
 meat, iii, 82
 medicinal, iii, 84
 mercurial, iii, 85
 mushroom, iii, 83
 potato, iii, 83
 ptomain, iii, 82
 sausage, iii, 82
 Polyposis, ii, 246
 rectocolonic, iii, 320
 Polyps causing anorectal hemorrhage, ii, 4
 in anal fissure, i, 234
 in diagnosis of anorectal diseases, i, 48
 of anorectal region, ii, 240
 proctidentia recti and, differential diagnosis,
 ii, 32
 hemorrhoids and, differential diagnosis,
 i, 468
 prolapsing, fecal incontinence from, i, 416
 Pork tapeworm, iii, 20
 Position, elevated lithotomy, ii, 350
 exaggerated knee-chest, ii, 325
 left Sims', ii, 350
 left Sims', ii, 325
 lithotomy, ii, 350
 of patient for examination in malignant
 growths of anorectal region, ii, 325
 for surgical treatment of malignant
 growths of anorectal region, ii, 350
 Trendelenburg, ii, 350
 Position, upright, ii, 325
 Positions for anorectal examination, i, 70, 86
 erect, i, 72, 73
 genupectoral, i, 71, 72, 86
 inverted, i, 72, 73, 86
 knee-chest, i, 71, 72, 86
 lithotomy, i, 70, 71, 86
 Sims', i, 70, 86.
 Postanal dimples, i, 178; ii, 264
 symptoms and diagnosis, i, 180
 treatment, i, 180
 gut, i, 6
 Posterior proctectomy in malignant growths
 of anorectal region, ii, 397
 Postsacral dimple and discharge in diagnosis
 of anorectal diseases, i, 50
 Potassium iodid as cancer remedy, ii, 340
 Potato poisoning, iii, 83
 Pot-belly, diagnostic significance of, ii, 458
 Pott's disease as cause of anorectal diseases,
 i, 95
 Pratt's anal dilators, i, 225
 operation for internal hemorrhoids, i, 519
 Pregnancy as extrarectal cause of anorectal
 diseases, i, 94
 hemorrhoidal operations in, i, 493
 Preliminary colostomy, iii, 402
 in surgical treatment of malignant ano-
 rectal growths, ii, 350, 353
 Preparation for examination of sigmoid
 flexure, rectum, and anus, i, 69
 Presacral anesthesia, i, 106
 Pressure forceps with detachable handles,
 Gant's, ii, 272
 Pricking or sticking sensation and pain in
 diagnosis of anorectal disease, i, 50
 Probes, i, 78, 341
 and retractor, firm steel, Gant's, i, 362
 Gant's, i, 80
 Proctidentia ani, ii, 23
 clamp operation in, ii, 38
 excision of circular strip of mucous mem-
 brane in, ii, 42
 Gant's local anesthesia ligature opera-
 tion in, ii, 39
 in malignant growths of anorectal region,
 ii, 323
 linear cauterization for, ii, 37
 purse-string suture in, ii, 40
 recti and sigmoidæ, anatomy of pro-
 truding mass, ii, 25
 diagnosis, ii, 31

- Procidentia ani, recti, and sigmoidæ, etiology,*
 ii, 25
 length of projecting gut, ii, 28
 prognosis, ii, 33
 prolapse of uterus complicating, ii,
 31
 symptopathology, ii, 27
 treatment, ii, 34
 injection, ii, 36
 non-operative, ii, 34
 palliative, ii, 34
 rectal plugs in, ii, 36
 reduction of protruded bowel in,
 ii, 36
 surgical, ii, 36
 complete, ii, 23
 definition, ii, 22
 partial, ii, 23
 postoperative, rectal and sigmoidal, after
 colostomy, avoiding, iii, 411
recti, ii, 23, 24, 42
 and sigmoid invagination as cause of
 chronic rectal obstipation, iii, 245
 causing anorectal hemorrhage, ii, 5
 Gant's anteroposterior proctoplasty in,
 ii, 45
 wire operation, ii, 46
 in childhood, iii, 448
 Maylard's operation for, ii, 56
 operation for, under local anesthesia, i,
 113
 polyps, hemorrhoids and, differential
 diagnosis, i, 468
 posterior proctoplasty, Gant's, in, ii,
 43
 proctopexy in, ii, 56
 proctorrhaphy in, ii, 43
 or infolding operation in, ii, 45
 advantages of, ii, 46
 prolapse of uterus complicating, ventral
 fixation of uterus in, ii, 52
 sigmoidopexy operation in, postoperative
 care, ii, 57
 treatment, postoperative, ii, 56
sigmoidæ, ii, 24, 47
 Allingham's operation for, ii, 56
 colopecty in, ii, 52
 Delorme's operation for, ii, 55
 Dieffenbach's operation for, ii, 55
 Dupuytren's operation in, ii, 56
 Duret's operation for, ii, 55
 excision operation in, Gant's, ii, 52
Procidentia sigmoidæ, Fowler's operation for,
 ii, 56
 Gant's combined, cuff, plicating, and
 sigmoidopexy operation for, ii, 50
 operation in, ii, 47
 gastropecty in, ii, 52
 Gersuny's operation for, ii, 56
 Matthews' operation for, ii, 56
 McArthur's operation for, ii, 56
 miscellaneous operations for, ii, 55
 Moschowitz's operation for, ii, 56
 prolapse of uterus complicating, ventral
 fixation of uterus or interposition
 operation in, ii, 52
 reduction of peritoneal slack in, ii, 51
 Robert's operation for, ii, 55
 Sick's operation for, ii, 56
 Tuttle's operation for, ii, 56
 Verneuil's operation for, ii, 56
 types of, ii, 23
 uteri complicating *procidentia recti*, ii, 52
Proctalgia, iii, 135
Proctectomy, abdominal, and sigmoidectomy
 in malignant growths of anorectal region,
 ii, 423
 abdominoperineal, indications for, ii, 383
 in malignant growths of anorectal region,
 ii, 416
 two-stage, in malignant growths of ano-
 rectal region, ii, 421
 where sphincter is preserved, in malign-
 ant growths of anorectal region, ii,
 420
 with colostomy, ii, 422
 anal, in malignant growths of anorectal
 region, ii, 425
 inferior, in malignant growths of anorectal
 region, ii, 383
 when sphincter is sacrificed, Gant's
 technic, ii, 384
 with preservation of sphincter, ii, 391
 partial, in malignant growths of anorectal
 region, ii, 424
 posterior, in malignant growths of anorectal
 region, ii, 397
 advantages of, ii, 397
 disadvantages of, ii, 397
 Gant's technic when coccyx
 and section of sacrum are
 removed, ii, 398
 two-stage operation, Gant's, ii,
 404

- Proctectomy, posterior, in malignant growths of anorectal region when osteo-integumentary flap is formed, Gant's technic, ii, 404
 lines of bone incision used by different operators in, ii, 398
 vaginal, in malignant growths of anorectal region, ii, 408
 Gant's technic, ii, 409
- Proctitis, i, 260; ii, 515
 catarrhal, i, 260. See also *Catarrhal proctitis*.
 gonorrheal, i, 278; ii, 179
 hemorrhagic, causing anorectal hemorrhage, ii, 4
 in anal fissure, i, 233
 in childhood, iii, 461
 incidence of, i, 261
 infectious specific, i, 277. See also *Infectious specific proctitis*.
 stenosing, ii, 149
 syphilitic, ii, 188, 190
 diagnosis, ii, 191
 in anorectal stricture, ii, 216
 symptoms, ii, 191
 treatment, ii, 191
- Proctodeum, i, 6
- Proctopexy in procidentia recti, ii, 56
- Proctoplasty, anteroposterior, Gant's, in procidentia recti, ii, 45
 in anorectal stricture, ii, 232-234
 posterior, Gant's, in procidentia recti, ii, 43
- Proctorrhaphy in procidentia recti, ii, 43
 or infolding operation in procidentia recti, ii, 45
 advantages of, ii, 46
- Proctoscope, funnel, and funnel pitcher, Gant's, ii, 543
 Law's, i, 76, 79
 Martin's, i, 78
 method of introducing, i, 86-88
 gauze pack through, ii, 14
 Tuttle's, i, 76, 78
 two-way irrigating, Gant's, iii, 10
- Proctoscopes, i, 75, 76
- Proctoscopic examination, i, 85
 in malignant growths of anorectal region, ii, 327
 technic, i, 86
- Proctoscopy, knec-chest position for, i, 71, 72, 86
- Proctosigmoidoscope, i, 260
- Proctosigmoidoscopic examination, inverted position for, i, 72, 73, 86
- Proctotomy, external, in anorectal stricture, ii, 230
 in malignant growths of anorectal region, ii, 335
 internal, in anorectal stricture, ii, 229
 valve clamp, Gant's, in anorectal stricture, ii, 234
- Prolapse, ii, 22. See also *Procidentia ani, recti, sigmoidæ*.
- Prolapsing polyp, fecal incontinence from, i, 416
- Prolapsus, ii, 22. See also *Procidentia ani, recti, and sigmoidæ*.
- Proliferating stenosing tuberculosis, ii, 150
- Prostatic calculi, ii, 500
 diseases, manifestations of, in anorectal diseases, i, 94
- Protozoal colitis, iii, 14
- Protruding internal hemorrhoids as cause of sphincteralgia, i, 222
- Protrusion in diagnosis of anorectal diseases, i, 47
- Protuberant cancer, ii, 307
- Pruritus ani, ii, 105, 143
 anal fissure and, differentiation, i, 240
 buttonhole operation under local anesthesia for, i, 110
 clinical definition, ii, 105
 coccogenous, ionic medication in, ii, 127
 vaccine therapy in, ii, 126
 depigmentation of skin in, ii, 114
 dermatologic causes, ii, 109
 diagnosis, ii, 117
 dietary causes, ii, 107
 etiology, ii, 106
 in anal fissure, i, 234
 in anorectal ulceration, ii, 91
 in childhood, iii, 454
 in diagnosis of anorectal diseases, i, 48
 local causes, ii, 109
 mechanical and irritative causes, ii, 107
 medicinal and chemical causes, ii, 109
 miscellaneous causes, ii, 109
 parasitic causes, ii, 108
 pathology, ii, 111
 physical characteristics, ii, 111
 postoperative, i, 540
 causes, ii, 109
 psychic, neurogenic, and reflex causes, ii, 107

- Pruritus ani**, senile causes, ii, 110
streptococcic infection in, ii, 110
subtegumentary adhesions in, ii, 114
symptoms, ii, 115
systemic causes, ii, 106
treatment, ii, 118
 antipruritic and curative agents, ii, 124
 avoiding heat and friction, ii, 122
 building up system, ii, 122
 by pressure, ii, 127
 cleanliness in, ii, 119
 irrigation of colon and rectum, ii, 120
 measures for protecting and keeping the skin dry, ii, 120
 methods for procuring comfortable daily stools, ii, 121
 non-operative, ii, 118
 and palliative, ii, 119
 of helminths, ii, 126
 prevention of scratching, ii, 121
 radiotherapy in, ii, 126
 regulating the diet and manner of living, ii, 122
 rest and sleep, ii, 122
 soothing, stimulating, and curative agents, ii, 123
 stimulating agents, ii, 124
 surgical, ii, 127
 advantages of Gant's buttonhole operation, ii, 132
 Ball's operation, ii, 129
 Gant's simplified local anesthesia buttonhole operation, ii, 131
 scroti, ii, 134
 vulvæ, ii, 134
- Pseudocancers**, iii, 323
- Pseudoconstipation**, treatment, iii, 218
- Pseudodiphtheric membranous inflammation** of colon and rectum, ii, 66
- Pseudodysenteric bacilli**, iii, 115
diarrhea, iii, 115
- Psilosis**, iii, 114
- Psoriasis**, ii, 141
- Psychic constipation**, ii, 95, 217
treatment, iii, 218
diarrhea, iii, 95
emotions, manifestations of, in anorectal diseases, i, 94
- Ptomain poisoning**, iii, 82
diagnosis, iii, 83
symptoms, iii, 83
treatment, iii, 83
- Ptyalin**, ii, 441
- Pudic artery**, internal, i, 26
- Puerperal diarrhea**, iii, 115
- Pulmonary and anorectal tuberculosis and fistula in ano**, relationship between, i, 393
- Pulse and temperature**, abnormal, in diagnosis of anorectal diseases, i, 53
rise in, diagnostic significance of, ii, 460
in anorectal wounds, i, 197
in diagnosis, i, 54
- Puncture wounds of abdominal viscera**, ii, 465
of anorectal region, i, 194
- Purgatives**, diarrhea from, iii, 99
- Purpura hæmorrhagica**, iii, 132
- Purse-string suture operation in procidentia ani**, ii, 40
sutures, iii, 360
- Pus**, discharge of, diagnostic significance of, ii, 457
- Pyramidal-shaped compress for arresting anorectal hemorrhage**, Gant's, ii, 12
- QUADRANTS**, isolating perianal region into, i, 57
- Quinin and urea hydrochlorid as local anesthetic**, i, 116
solutions for injection treatment of internal hemorrhoids, i, 482, 488, 490
- RACEMOSE glands of rectum**, i, 17
- Rachischisis**, i, 156
- Radiotherapy in malignant growths of anorectal region**, ii, 337
in pruritus ani, ii, 126
- Ray fungus**, iii, 107
- Rectal actinomycosis**, iii, 108
anesthesia, i, 99; iii, 137
cancer as contraindication to hemorrhoidal operation, i, 493
diseases of infancy and childhood, iii, 441
diverticula, ii, 286. See also *Anorectal diverticula*.
evacuator, Gant's, ii, 11
fistula, definition, i, 313
hyperesthesia, iii, 137
inflation, i, 260
intercourse, ii, 201
invagination in malignant growths of anorectal region, ii, 323
masturbation, ii, 205
neuralgia, iii, 135
onanism, ii, 205, 480

- Rectal polyps, ii, 240
 resection, disadvantages of, ii, 348
 scissors, i, 504
 supports, i, 39
 tamponing in atonic constipation, iii, 211
 tube for inflating and irrigating, i, 62
 tuberculosis, ii, 75
 hypertrophic, ii, 156
 neoplastic, ii, 156
 ulcerative, ii, 156
 valve stricture, ii, 217
 valves, hypertrophied, in childhood, iii, 454
- Rectitis, i, 260. See also *Catarrhal proctitis*.
- Rectocele, anterior, diverticulum with uterine procidentia simulating fecal cyst, ii, 285
- Rectococcygeal fistula, i, 388
- Rectococcygeus muscles, i, 35
- Rectocolonic ataxic crises, iii, 138
 focal infection and its relation to systemic diseases, iii, 117
 hemachromatosis, iii, 86
 infection, amebic, ii, 81
 neuroses, iii, 133
 ataxic crises, iii, 138
 rectum, iii, 138
 borborygmi, iii, 137
 constipation, iii, 133
 diarrhea, iii, 134
 digestive hysteria, iii, 140
 enteralgic and celiac pains, iii, 135
 enterospasm, iii, 134
 fecal incontinence, iii, 137
 general remarks, iii, 133
 gout and rheumatism, iii, 140
 hysterie, irritable rectum, iii, 135
 membranous enterocolitis, iii, 139
 proctalgia, iii, 135
 rectal anesthesia, iii, 137
 hyperesthesia, iii, 137
 neuralgia, iii, 135
 tabetic crises, iii, 138
 rectum, iii, 138
 oil-ether anesthesia, i, 99
 ointment applicator, Gant's, ii, 224
 pigmentation, iii, 86
 polyposis, ii, 246; iii, 320
 tabetic crises, iii, 138
- Rectolabial fistula, i, 376
- Rectophobia, i, 541
- Rectosacral fistula, i, 386
- Rectosigmoidal juncture, ii, 434
 malignant growths of, ii, 293. See also *Anorectal region, malignant growths of*.
 non-malignant growths of, ii, 238. See also *Anorectal region, non-malignant growths of*.
- Rectosigmoidostomy for high rectal stricture, ii, 235
 in anorectal stricture, ii, 234
- Recto-urethral fistula, i, 382
 diagnosis, i, 383
 etiology, i, 382
 prognosis, i, 384
 rectovesical fistula and, Tuttle's differentiation, i, 383
 symptoms, i, 382
 treatment, i, 384
 surgical, i, 384
 Tuttle's operation in, i, 385
- Rectovaginal fistula, i, 373
 Gant's method of closing, i, 375
 septum, adenomyoma of, ii, 246
 lymphatics of, i, 32
- Rectovesical fascia, i, 41
 fistula, i, 376
 diagnosis, i, 379
 prognosis, i, 379
 recto-urethral fistula and, Tuttle's differentiation, i, 383
 symptoms, i, 378
 treatment, i, 380
- Rectovulvar fistula, i, 376
- Rectum, i, 3, 7
 absence of, total, i, 140
 absorptive powers of, ii, 443
 ampulla of, i, 12, 13
 anatomy, i, 12
 and anus, hemorrhage from, ii, 1. See also *Anorectal hemorrhage*.
 partial occlusion of, by membranes or fibrous bands, i, 131
 union between, development of, i, 7
 and large intestine, cancer of, fecal impaction and, differential diagnosis, iii, 308
 anomalies, i, 123
 ataxic, iii, 138
 ballooning of, in diagnosis of anorectal diseases, i, 51
 bifurcated, ii, 287
 blood-supply of, i, 24
 burning in, in diagnosis of anorectal diseases, i, 50

Rectum, chaneroids of, ii, 181
 compartments of, i, 13
 danger zone of, ii, 365, 366
 embryology, i, 1, 5
 epithelium of, i, 17
 examination and diagnosis of, i, 54, 69
 fixed, i, 12, 14
 feces in, i, 15
 lesions in, i, 15
 position of, i, 14
 shape, i, 14
 focal infection of, relation to systemic disease, iii, 117
 foreign bodies in, ii, 474. See also *Foreign bodies*.
 funnel-shaped, entrance to, in diagnosis of anorectal diseases, 50
 gangrene of, complicating rectal excision, ii, 360
 gas-pipe, ii, 149, 158, 191, 211
 glands of, i, 17
 gonorrhea of, ii, 179
 honeycombed appearance of mucosa of, i, 17
 hysteric, iii, 95, 135
 imperforate, i, 139
 with spinal outlet, i, 128
 introduction of hand into, i, 85
 invagination of sigmoid flexure into, causing anorectal hemorrhage, ii, 6
 irritable, iii, 135
 length, i, 12
 Lieberkühn's glands of, i, 17
 lower, i, 12
 lupus of, ii, 167. See also *Lupus of perianal skin and rectum*.
 lymphatics of, i, 29, 30
 malformations of, i, 123, 139
 types of, i, 139
 malignant growths of, ii, 293. See also *Anorectal region, malignant growths of*.
 membranous obstruction of, i, 141
 movable, i, 13
 feces in, i, 15
 lesions in, i, 14
 mobility of, i, 13
 position of, i, 13
 shape, i, 13
 mucous coat of, i, 17
 solitary glands of, i, 17
 mucous-secreting goblet cells of, i, 17
 muscles of, i, 33

Rectum, muscular coat of, i, 16
 circular muscle-fibers of, i, 16
 nerve supply of, i, 29
 non-malignant growths of, ii, 238. See also *Anorectal region, non-malignant growths of*.
 normal, and other organs, connection between, i, 149
 opening into another organ where anus is normal or absent, i, 142
 into bladder in imperforate anus, i, 146
 into urethra in imperforate anus, i, 147, 148
 into uterus in imperforate anus, i, 148
 into vagina in imperforate anus, i, 144
 on surface in imperforate anus, i, 150
 through glans penis in imperforate anus, i, 147
 openings in, in diagnosis of anorectal diseases, i, 49
 packing with stypticized gauze for arresting bleeding from ulcers and oozing areas, ii, 11
 palpation of, i, 60
 peritoneal coat of, i, 15
 position of, i, 12
 prolapse of, ii, 22. See also *Procidentia ani, recti, and sigmoidæ*.
 racemose glands of, i, 17
 relations of, i, 39
 sebaceous glands of, i, 17
 semilunar valves of, i, 18
 function of, i, 18
 sensibility of, i, 29; ii, 454
 separation of, from urogenital sinus, during development of human fetus, i, 7
 serous coat of, i, 15
 stricture of, causing anorectal hemorrhage, ii, 4
 following fistula operation, i, 372
 syphilitic, ii, 194
 treatment, ii, 195
 structure, i, 15
 submucous coat of, i, 17
 sudoriferous glands of, i, 17
 supporting structures, i, 39
 syphilis of, ii, 184
 tabetic, iii, 138
 terminating at sacral end, coccyx congenitally absent, in imperforate anus, i, 134, 149
 at short or considerable distance above anus, i, 140

- Rectum, tuberculosis of, ii, 144. See also
Tuberculosis of upper rectum.
tumors of. See *Anorectal region, malignant and non-malignant growths of.*
upper, i, 12
 blood-vessels of, ii, 365
 diverticulum of, simulating an old
 abscess cavity, ii, 291
 treatment, ii, 291
 inflation of, i, 13
 valves of, i, 13, 20
 number, i, 20
 position of, i, 21
 structure of, i, 21
 venereal diseases of, ii, 179
 wounds of, i, 191
Recumbent position for abdominal examinations, i, 71, 73, 86
Reflex disturbances, diarrhea in, iii, 102
 in anal fissure, i, 234
Regional anesthesia, i, 106
Relapsing fever, diarrhea in, iii, 112
Relations coexisting between anorectal and other diseases, i, 93
Rennin, ii, 441
Reproductive organs, female, diseases of, manifested in anorectal diseases, i, 94
Resection and amputation in malignant growths of anorectal region, comparative merits of, ii, 348
 in malignant growths of colon and sigmoid flexure, iii, 350
 in tuberculosis of intestines, iii, 69
 with hysterectomy, history of, ii, 344
 in malignant growths of anorectal region, ii, 344
Reservoir, fecal, soft-rubber, Gant's, ii, 236, 395, 396, 416
Retention cysts of anorectal region, ii, 261
 of urine following fistula operation, i, 371
 postoperative, i, 539
Reticular-celled sarcoma, ii, 314
Retractor and probes, firm steel, Gant's, i, 362
Retrocecal fossa, ii, 429
Retroperitoneal cysts of colon and sigmoid flexure, iii, 326
Retrorectal abscesses, i, 301
 treatment, i, 302
 spaces, i, 39
Rhen-Rydygier's osteo-integumentary flap operation, ii, 343
Rheumatism and gout, iii, 140
Rhythmic segmentation of small intestine, ii, 444
Rickett's submucous ligation operation for hemorrhoids, i, 481
Rieder's radiographs showing time required for feces to reach different colonic segments and rectum, ii, 444-449
Right colic artery, ii, 436
Right-angle suture, Cushing, iii, 361
Ring-worm of perianal region, ii, 141
Rise in pulse and temperature, diagnostic significance of, ii, 460
Robert's operation for procidentia sigmoidæ, ii, 55
Rodent anorectal ulceration, ii, 63
Roentgenotherapy in malignant growths of anorectal region, ii, 338
Rolling movement of small intestine, ii, 444
Rose plaster, binder pattern for, iii, 257
Rotary wheel massage for constipation, iii, 208
Round-celled sarcoma, ii, 314
Round-worms, iii, 25
 as cause of pruritus ani, ii, 108
 infection from, iii, 22
Rupture, diagnostic significance of, ii, 457
 of intestinal organs, ii, 463
 of intestine from contusions, ii, 464
 from pneumatic tube, ii, 464
Rydygier's technic of rectal extirpation, ii, 345
Sac, yolk, i, 1
Sacral anesthesia, i, 102, 103
 solutions for, i, 105
 technic, i, 104
 artery, lateral, i, 26
 middle, i, 24
 excision, history and evolution of, ii, 342
 in malignant growths of anorectal region, ii, 342, 397
 Kraske's operation, mortality of, ii, 355
 lymph-nodes, enlargement of, diagnostic significance of, ii, 458
 vein, middle, i, 27, 28
Sacrocoecal cysts, i, 167, 178
 in childhood, iii, 446
 symptoms and diagnosis, i, 180
 treatment, i, 180
 dimples, i, 178
 symptoms and diagnosis, i, 180
 treatment, i, 180

- Sacrococcygeal disturbances, analysis of author's cases of, i, 177
- fistulæ, i, 178
- symptoms and diagnosis, i, 180
- treatment, i, 180
- fovea, ii, 178
- injuries, fractures, and dislocations, i, 165
- diagnosis, i, 165
- symptoms, i, 165
- treatment, i, 166
- malformations, i, 159
- injuries, fractures, dislocations, coccygectomy in, i, 163
- surgical treatment of, i, 162
- necrosis, i, 172
- region, rectum terminating at, coccyx being congenitally absent in imperforate anus, i, 134, 149
- syphilis, i, 172
- tuberculosis, i, 172
- tumors, i, 167
- Braune's classification, i, 168
- diagnosis, i, 170
- Holmes' classification, i, 168
- of anorectal region, ii, 264
- prognosis, i, 171
- symptoms, i, 170
- treatment, i, 171
- Sacro-iliac bones, diseases of, pains from, simulating anorectal diseases, i, 95
- displacement, i, 183
- inflammation, i, 183
- relaxation, i, 183
- Sacrovaginal proctorrhaphy in procidentia recti, ii, 45
- advantages of, ii, 46
- Safety-pin, steel, Gant's, ii, 384
- Saliva, ii, 441
- Salmon's cut, i, 354
- Salt solution, normal, and sterile water as local anesthetic, i, 116
- Sand diarrhea, ii, 494
- intestinal, ii, 494
- Sarcoma, anal, ii, 90
- diffusum, ii, 316
- fungosum, ii, 317
- fusocellulare, ii, 314
- gigantocellulare, ii, 315
- globocellulare, ii, 314
- hæmorrhagicum, ii, 316
- medullare, ii, 314
- melanotic, ii, 318
- Sarcoma of anorectal region, ii, 263. See also *Anorectal region, malignant growths of.*
- of colon and sigmoid flexure, iii, 335. See also *Colon and sigmoid flexure, malignant growths of.*
- polyposum, ii, 317
- reticular-celled, ii, 314
- reticulare, ii, 315
- round-celled, ii, 314
- sacrococcygeal, i, 168
- spindle-celled, ii, 314
- telangiectodes, ii, 316
- tuberosum, ii, 317
- Sausage poisoning, iii, 82
- Scabies, ii, 141
- Schistosoma hematobium, iii, 35
- japonica, iii, 35
- mansonii, iii, 35
- Schistosomiasis, ii, 61; iii, 35
- diagnosis, iii, 37
- prognosis, iii, 37
- symptoms, iii, 35
- treatment, iii, 37
- Sciatica, i, 187
- diagnosis, i, 188
- etiology, i, 187
- surgical intervention, i, 190
- symptoms, i, 188
- treatment, i, 189
- Scirrhus cancer, ii, 309
- Scissors, fissure, Gant's, i, 249
- fistula, probe-pointed, Gant's, i, 342
- rectal, i, 504
- Scopolamin and morphin preliminary to abdominal local anesthesia, i, 121
- Scorbutic diarrhea, iii, 106
- Scotch douche for atonic constipation, iii, 201
- Scrotum, retracting, for anorectal operations, Gant's method, i, 494
- Seat syringe, Jamison's, ii, 226; iii, 182
- Seat-worm infection, iii, 29
- Sebaceous glands of rectum, i, 17
- Self-retaining anal dilator, i, 225; ii, 225; iii, 286
- irrigator, Gant's, iii, 391
- Semilunar valves of rectum, i, 18
- function of, i, 18
- Senile diarrhea, iii, 102
- Sensation of bowel blocking, diagnostic significance of, ii, 461
- Sensibility of small intestine, colon, and rectum, i, 29; ii, 454

- Sensitive spinal skin areas, diagnostic significance of, ii, 461
- Sensitiveness of rectum, i, 29
- Sentinel piles, i, 228, 231
- Sepsis, acute, diagnostic significance of, ii, 458
colonic, blood in, i, 65
in anorectal wounds and injuries, i, 197
in diagnosis of anorectal diseases, i, 52
- Septic abscess, diffuse, i, 311
diarrhea, iii, 113
- Septum, rectovaginal, lymphatics of, i, 32
- Sera as cancer remedy, ii, 341
- Serotherapy in bacillary rectocolonic ulceration, ii, 86
in tuberculosis of intestine, colon, and sigmoid flexure, iii, 64
- Serum and vaccine therapy in focal infection of colon, sigmoid flexure, and rectum, iii, 121
in bacillary colitis, iii, 9
- Seton operation for anorectal fistula, i, 367
- Sheldon portable vibrator, iii, 206
- Shiga bacilli, ii, 85, 527
- Shock in anorectal wounds and injuries, i, 196
- Short-circuiting, iii, 422
- Shuford's solution for injection treatment of internal hemorrhoids, i, 488
- Sick's operation for procidentia sigmoidæ, ii, 56
- Sigmoid arteries, ii, 438
colon, abnormalities of, i, 10
flexure, ii, 432
and colon, amebic ulcers of, ii, 536
benign growths of, iii, 317
blood-vessels of, ii, 365
congenital idiopathic dilatation of, iii, 292. See also *Hirschsprung's disease*.
malformations of, ii, 504. See also *Colon and sigmoid flexure, malformations of*.
venereal diseases of, iii, 74
and rectum, hypersensitive areas in, causing desire to stool, iii, 96
block method of resecting, iii, 364
blood-supply of, ii, 436
diagnostic significance of manifestations pointing to disease in, ii, 455
diverticula of, iii, 155
examination of, i, 69
focal infection of, relation to systemic diseases, iii, 117
- Sigmoid flexure, foreign bodies in, ii, 474.
See also *Foreign bodies*.
hemorrhage of, iii, 123
inflammation of, i, 260
invagination of, into rectum, causing anorectal hemorrhage, ii, 6
length, ii, 433
lymphatics of, ii, 439
manifestations and signs of disease involving, ii, 455
nerve supply of, ii, 438
position, ii, 433
assumed by, ii, 451
prolapse of, ii, 22. See also *Procidentia ani, recti, and sigmoidæ*.
tuberculosis of, iii, 43. See also *Tuberculosis of intestine, colon, and sigmoid flexure*.
varying lengths of, ii, 450
wounds and injuries of, ii, 463. See also *Wounds of abdominal viscera*.
invagination and procidentia recti, as cause of chronic rectal obstipation, iii, 245
- Sigmoidal diseases of infancy and childhood, iii, 441
- Sigmoidectomy, abdominal proctectomy and, in malignant growths of anorectal region, ii, 423
- Sigmoiditis, i, 260; ii, 515
and colitis, gonorrheal, iii, 79
- Sigmoidoproctostomy in connection with excision in malignant growths of anorectal region, ii, 396
- Sigmoidoscope, inability to introduce, diagnostic significance of, ii, 462
- Sigmoidoscopes, i, 75, 76
- Sigmoidoscopic examination, i, 85
technic, i, 86
- Sigmoidostomy, iii, 396, 407
- Silk vs. harness linen for sutures, i, 112
- Sims', exaggerated left, position, ii, 350
position for rectal examination, i, 70, 86
- Sinus, pilonidal, sacrococcygeal, i, 178
urogenital, i, 6, 7
in female fetus, i, 6
in male fetus, i, 6
- Sinusoidal current in atonic constipation, iii, 207
- Sitophobia, diarrhea in, iii, 100
- Sitting or standing posture, abnormal, in diagnosis of anorectal diseases, i, 51

- Sitz-bath for atonic constipation, iii, 200
- Skatol, ii, 443
- Skin affections of perianal region and buttocks, ii, 135
- and mucosa, excoriation of, in anal fissure, i, 233
- depigmentation of, in pruritus ani, ii, 114
- diseases inducing gastro-intestinal symptoms, iii, 90
- edema of, postoperative, i, 539
- lesions and discolorations, diagnostic importance of, ii, 461
- (cracks) anal fissure and, differentiation, i, 239
- perianal, inflammation and discoloration of, in diagnosis of anorectal diseases, i, 50
- lymphatics of, i, 30
- openings in, in diagnosis of anorectal diseases, i, 49
- Skin-tags in diagnosis of anorectal diseases, i, 50
- Sloughing of anorectal structures following hemorrhoid operations, i, 542
- Slow-cooking procedure, Percy's, in malignant growths of anorectal region, ii, 339
- Small intestine, ii, 426. See also *Intestine, small*.
- Sodomy, ii, 201
- Soft cancer, ii, 309
- Soft-rubber bougie, Wales', ii, 225
- enterocolonic irrigator, Gant's, iii, 376
- in position, iii, 377
- fecal reservoir, Gant's, ii, 236
- Solanin, iii, 83
- Solutions, irrigating, iii, 389
- amount, iii, 391
- hot, iii, 390
- used in injection treatment of internal hemorrhoids, composition of, i, 487
- Spasm of external sphincter, i, 220. See also *Sphincteralgia*.
- of sphincter complicating anorectal ulceration, ii, 102
- Spasmodic stricture, anorectal, ii, 208
- Spastic constipation, iii, 216
- diagnostic significance of, ii, 456
- in diagnosis of anorectal diseases, i, 52
- Speculum, Brinkerhoff's slide, i, 76
- examining, i, 74
- Gant's, i, 75, 76
- operating, Gant's, ii, 229
- Sphincter ani, division and divulsion of, in hemorrhoidal operations, i, 499
- external, i, 33
- function, i, 34
- nerve supply, i, 34
- spasm of, i, 220. See also *Sphincteralgia*.
- hypertrophy of, as cause of chronic rectal obstipation, iii, 245
- incision of, in anorectal fistula operations, i, 348
- internal, i, 16, 35
- O'Beirne's, i, 13; ii, 434, 436
- relaxation of, in diagnosis of anorectal diseases, i, 50
- shortening, in operation for fecal incontinence, i, 416
- vaginae, i, 39
- Sphincteralgia, i, 45, 220
- and contractions of levator ani muscle following hemorrhoid operations, i, 534
- definition, i, 220
- diagnosis, i, 223
- etiology, i, 221
- in anal fissure, i, 232
- in anorectal ulceration, ii, 91
- in diagnosis of anorectal diseases, i, 50
- in malignant growths of anorectal region, ii, 322
- pathology, i, 223
- symptoms, i, 223
- treatment, i, 224
- Sphincteric spasm complicating anorectal ulceration, ii, 102
- Spina bifida, i, 154; ii, 259
- anterior, 156
- associated congenital anomalies, i, 155
- diagnosis, 157
- etiopathology, i, 155
- occulta, i, 154, 156
- prognosis, 157
- symptoms, i, 157
- treatment, i, 157
- radical operation for, i, 157
- varieties of, i, 155
- Spinal anesthesia, i, 99
- advantages of, i, 100
- anesthetic agents for, i, 101
- apparatus for, i, 101
- cause of death from, i, 100
- complications of, i, 100
- danger from, i, 100

- Spinal anesthesia, technic, i, 101
 cord and brain diseases inducing entero-
 colonic disturbances, iii, 91
 douche in chronic atonic constipation, iii,
 198
 meningocele, i, 155
 outlet with imperforate rectum, i, 128
 palpation, i, 61
 skin areas, sensitive, diagnostic significance
 of, ii, 461
- Spindle-celled sarcoma, ii, 314
- Spirochæta pallida, ii, 186; iii, 75
- Spirochetes, iii, 15
- Splashing and gurgling sounds, diagnostic
 significance of, ii, 461
- Sponge method of controlling idiopathic and
 postoperative hemorrhage, Gant's, ii, 17, 18
- Spoons, i, 79, 81
- Spraying in anorectal ulceration, ii, 98
- Sprue, iii, 114
 treatment, iii, 115
- Squamous, flat, pavement-celled epithelioma,
 ii, 299
- Stab-wound appendicostomy, simple, Gant's,
 iii, 381
 cecostomy, Gant's, iii, 380
- Standing or sitting posture, abnormal, in
 diagnosis of anorectal diseases, i, 51
- Stasis, intestinal, iii, 219. See also *Obstipa-
 tion*.
 definition, iii, 173
- Static current in atonic constipation, iii, 209
- Statistics of cancer, William's table, ii, 293
- Steapsin, ii, 442
- Steatorrhea, iii, 90
- Steel safety-pin, Gant's, ii, 384
- Stegomyia fasciata, iii, 111
- Steinthal, Maunsell, and Weir's method of
 handling bowel ends when sphincter is
 preserved, ii, 380
- Stenosing anorectal ulceration, ii, 77
 proctitis, ii, 149
- Stenosis, anorectal, ii, 207. See also *Anorectal
 stricture*.
 of colon and sigmoid flexure, ii, 506
- Sterile water and normal salt solution as local
 anesthetic, i, 116
- Sticking or pricking sensation and pain in
 diagnosis of anorectal diseases, i, 50
- Stigmata, diagnostic significance of, ii, 458
- Stomach, cardiac end, i, 2
 contents, examination of, i, 62
- Stomach, diseases of, inducing enterocolonic
 disturbances, iii, 91
 embryology of, i, 1, 2
 examination and diagnosis of, i, 54
 glands of, development of, i, 8
 greater curvature of, i, 2
 hemorrhage of, iii, 123
 lesser curvature of, i, 2
 primitive, surface cells of mesodermic
 stratum of, i, 8
 pyloric end, i, 2
- Stool, frequent desire to, in diagnosis of ano-
 rectal diseases, i, 49
- Stools, ii, 447. See also *Feces*.
 blood in, iii, 123
 examination of, i, 63
 malformed, in malignant growths of ano-
 rectal region, ii, 321
 odor of, in diagnosis, i, 64
- Stovain as anesthetic, i, 114
- Strain, back, i, 183
- Straining in anorectal malignant disease, ii,
 320
 in diagnosis of anorectal diseases, i, 48
- Strauss' inflating and irrigating rectal tube,
 i, 62
- Streptococcic infection in pruritus ani, ii, 110
- Streptococcus fecalis, ii, 110
 pruritus ani from, vaccine therapy in, ii,
 126
- Streptothrix actinomycosis, iii, 107
- Strictural ulceration, anorectal, ii, 89
- Stricture, anal or rectal, as cause of chronic
 rectal obstipation, iii, 244
 following fistula operation, i, 372
 anorectal, ii, 207. See also *Anorectal
 stricture*.
 as cause of chronic obstipation, iii, 237
 complicating anorectal tuberculosis, ii, 159
 dilator, Gant's spring, ii, 227
 in childhood, iii, 450
 of rectum causing anorectal hemorrhage,
 ii, 4
 syphilitic, of colon and sigmoid flexure, iii,
 79
 treatment, iii, 79
 of rectum, ii, 194
 treatment, ii, 195
- Strokes, heat and sun, diarrhea from, iii, 101
- Strongyloides intestinalis, iii, 114
- Strongyloidosis, iii, 33
- Stroud, pecten of, i, 7

- Styptic agents in anorectal ulceration, ii, 100
 Subcutaneous marginal abscess of anorectal region, i, 290
 tenotomy, i, 164
 Submucocutaneous fistula, i, 391
 myotomy for anal fissure, i, 253
 Submucous abscess, i, 306
 air or gas cyst, case reports, ii, 282
 fecal cyst, case report, ii, 283
 fistula, i, 389
 diagnosis and symptoms, i, 391
 treatment, i, 392
 ligation for hemorrhoids, Rickett's operation, i, 481
 Subtegumentary adhesions in pruritus ani, ii, 114
 Suction cup method of withdrawing hemorrhoids, i, 461, 462
 Sudoriferous glands of rectum, i, 17
 Sun and heat strokes, diarrhea from, iii, 101
 Sundry diseases, resultant gastro-intestinal, colonic, and rectal disturbances, iii, 99
 Superficial nerves of anorectal region, i, 29
 Superior hemorrhoidal artery, ii, 436
 pelvirectal abscess, i, 303
 aspiration in, i, 305
 diagnosis, i, 304
 symptoms, i, 303
 treatment, i, 305
 Suppositories in anorectal ulceration, ii, 101
 Suppurative or infectious diseases of eye, mouth, nose, and throat as cause of anorectal diseases, i, 95
 Suprarenal disease inducing gastro-intestinal disturbances, iii, 90
 Surgical constipation in childhood, iii, 455
 enema in diagnosis, iii, 456
 importance of anorectal lymphatics, i, 32
 Sutika, iii, 115
 Sutures and ligatures, failure of, to come out, postoperative, i, 540
 Connell's, continuous, iii, 358
 Cushing right-angle, iii, 361
 Glover's, iii, 359
 Halsted mattress, iii, 361
 hitch-stitch, iii, 359
 Lembert, iii, 359
 lock-stitch, iii, 359
 purse-string, iii, 360
 silk vs. harness linen, i, 112
 through-and-through, iii, 360
 whip-stitch, iii, 359
 Swelling, abdominal, diagnostic significance of, ii, 458
 in diagnosis of anorectal diseases, i, 48
 Syncope in enterocolonic hemorrhage, iii, 126
 Syphilids, papular, of perianal skin, ii, 186, 188
 Syphilis, ii, 184
 primary, ii, 185
 diagnosis, ii, 186
 mixed infection in, ii, 185
 symptoms, ii, 185
 treatment, ii, 186
 sacrococcygeal, i, 172
 secondary, ii, 186
 condylomata lata in, ii, 188
 diagnosis, ii, 187
 mucous patches in, ii, 187
 papular eruptions in, ii, 188
 perianal erosions in, ii, 188
 symptoms, ii, 187
 treatment, ii, 187
 ulceration in, ii, 188
 tertiary, ii, 190
 ulceration of, 192
 diagnosis, ii, 193
 symptoms, ii, 193
 treatment, ii, 193
 Syphilitic enteritis and colitis, iii, 74
 diagnosis, iii, 76
 etiology, iii, 75
 pathology, iii, 75
 prognosis, iii, 76
 symptoms, iii, 76
 treatment, iii, 76
 gummata, ii, 196
 lesions, anal fissure and, differentiation, i 240
 stricture, anorectal, ii, 215
 ulcers of anorectal region, ii, 88
 warts, ii, 188
 diagnosis, ii, 190
 symptoms, ii, 190
 treatment, ii, 190
 Syphiloma, anorectal, ii, 196
 Syringe, Davidson's, iii, 310
 enema, baby, hard-rubber piston, iii, 197
 fountain, i, 82; ii, 97
 metal, with goose-neck attachment, i, 111
 vs. glass, i, 112
 seat, Jamison's, ii, 226; iii, 182
 small glass goose-neck, Gant's, i, 490
 Syringomyelocoele, i, 156

- TABES dorsalis, abnormal bowel movements in, iii, 96
- Tabetic crises, rectocolonic, iii, 138
rectum, iii, 138
- Table, Allison's, i, 74
Hane's, i, 74
- Tænia lata, iii, 20
nana, iii, 20
saginata, iii, 20
as cause of pruritus ani, ii, 108
solium, iii, 20
- Tamponing, rectal, in atonic constipation, iii, 211
- Tampons, medicated, in anorectal ulceration, ii, 102
- Tapeworms as cause of pruritus ani, ii, 108
beef, iii, 20
dwarf, iii, 20, 21
fish, iii, 20
infection, iii, 20
pork, iii, 20
- Tapotement in atonic constipation, iii, 202
- Tegumentary abscesses of anorectal region, i, 287
- Temperature and pulse, abnormal, in diagnosis of anorectal diseases, i, 53
rise in, diagnostic significance of, ii, 460
in anorectal wounds, i, 197
in diagnosis, i, 54
- Temporary colostomy, iii, 402
- Tenderness in anorectal region in diagnosis of anorectal diseases, i, 48
- Tenesmus in anorectal malignant disease, ii, 320
ulceration, ii, 92
in diagnosis of anorectal diseases, i, 48
- Teniasis, iii, 20
- Tenotomy, subcutaneous, i, 164
- Teratoma of anorectal region, ii, 262
- Terror, fecal incontinence induced by, i, 29
- Tetanus following hemorrhoid operation, i, 543
- Thread-worms as cause of pruritus ani, ii, 108
infection from, iii, 29
- Thrombosis, mesenteric, iii, 329
- Thrombotic hemorrhoids as cause of anorectal abscess, i, 282
- Through-and-through colonic irrigation, Gant's method, iii, 392
sutures, iii, 360
- Thyroid disease inducing enterocolonic disturbances, iii, 89
- Time required for transportation of chyme and feces through different segments of alimentary tract, ii, 445, 446
of food from cecum into rectum, ii, 445
from duodenum to cecum, ii, 445
- Tinca circinata, ii, 141
- Tissue débris, discharge of, diagnostic significance of, ii, 457
forceps, i, 79, 81
- Topical applications in anorectal ulceration, ii, 99
- Torsion operation for hemorrhoids, Manley's, i, 481
- Toxemia, intestinal, in diagnosis of anorectal diseases, i, 52
- Tractor, metal, Gant's, for proctectomy operations, ii, 387
- Transillumination in diagnosis, i, 62
- Transverse colon, i, 3, 5; ii, 431
displacements of, i, 10
- Transversus perinei, i, 34
- Traumatic anorectal ulceration, ii, 73
stricture, anorectal, ii, 209
causes, ii, 210
- Trematodes, iii, 35
- Trematodic infection, iii, 35
- Trendelenburg position, ii, 350
- Treponema pallidum, iii, 75
- Trichinella spiralis, iii, 25
- Trichiniasis, iii, 25
- Trichomonas hominis, iii, 14
- Trichosis, i, 156
- Trichuriasis, iii, 33
- Trichuris trichiura, iii, 33
- Tropacocain as anesthetic, i, 114
- Tropical diarrheas, iii, 114
treatment, iii, 114
dysentery, ii, 525
- Trypsin, ii, 441
- Tube and funnel for administering medicated enemata, ii, 97
for high colonic enemata, ii, 332
intestinal, long-jointed, Einhorn's, ii, 519
- Tube-like diverticulum in anal canal filled with feces, case report, ii, 284
- Tubercle bacilli, iii, 43
- Tubercles, miliary, in anal canal, ii, 79
- Tubercular abscesses, i, 307
multilocular, i, 308
anorectal ulceration, ii, 74
atrophic, ii, 77
hyperplastic, ii, 76

Tubercular fistula, diagnosis, i, 395
 groups of, i, 394
 non-tubercular and, differential diagnosis between, i, 397
 postoperative treatment, i, 399
 prognosis, i, 398
 symptoms, i, 395
 treatment, i, 398
 operative, i, 398
 ischiorectal abscesses, i, 297
 marginal abscesses of perianal region, i, 292
 neoplasms as cause of chronic obstipation, iii, 243
 peritonitis complicating intestinal tuberculosis, iii, 59
 stricture, anorectal, ii, 211
 tumor, neoplastic, of anorectal region, ii, 258
 ulcers, perianal, ii, 79
 Tuberculin test in diagnosis, i, 69
 Tuberculosis, anal canal, ii, 78, 151
 anorectal, ii, 144; iii, 53
 complications, ii, 159
 diagnosis, ii, 159
 primary, ii, 144
 secondary, ii, 144
 stricture complicating, ii, 159
 symptoms, ii, 157
 treatment, ii, 160
 hygienic measures, ii, 161
 local, ii, 162
 medicinal, ii, 161
 surgical, ii, 165
 blood in, i, 64
 cutis ani, ii, 153
 ileocec hyperplastic, cancer and, Gant's differential diagnosis, iii, 61
 of ampulla of rectum, ii, 145
 of appendix, iii, 53
 of fixed rectum, ii, 151
 of lungs and rectum, hemorrhoidal operations in, i, 493
 of perianal region, ii, 153
 miliary, ii, 157
 verrucous, ii, 157
 of small intestine, colon, and sigmoid flexure, iii, 43
 carcinomatous graftings in, iii, 54
 classification, iii, 46
 complications and sequelæ, iii, 57
 deep ulcerative-enteroperitoneal type, iii, 48

Tuberculosis of small intestine, colon, and sigmoid flexure, diagnosis, iii, 59
 etiology, iii, 46
 fibrosclerotic, iii, 51
 general remarks, iii, 43
 glandular type, iii, 52
 hyperplastic, hypertrophic, neoplastic type, iii, 49
 measures for improving general health, iii, 62
 miliary type, iii, 52
 pathology, iii, 47
 peritoneal type, iii, 52
 superficial ulcerative enteric type, iii, 47
 symptoms, iii, 54
 treatment, iii, 61
 appendicocostomy in, iii, 66
 appendicostomy in, iii, 66
 or cecostomy and through-and-through irrigation in, iii, 67
 cecostomy in, iii, 66
 enterostomy, ileostomy, and colostomy in, iii, 70
 fulguration in, iii, 65
 Gant's ileocecostomy in, iii, 66
 intestinal exclusion in, iii, 68
 and resection in, relative value of, iii, 70
 irrigating, iii, 64
 medicinal, iii, 62
 prophylactic measures, iii, 62
 resection in, iii, 69
 routine measures, iii, 61
 serotherapy in, iii, 64
 surgical, iii, 65
 topical applications, iii, 65
 tubercular peritonitis complicating, iii, 59
 of upper rectum, ii, 145
 fibrosclerotic, ii, 149
 symptoms, ii, 157
 hypertrophic, ii, 147
 symptoms, ii, 156
 miliary, ii, 150
 symptoms, ii, 157
 neoplastic, ii, 147
 symptoms, ii, 156
 ulcerative, ii, 146
 symptoms, ii, 156

- Tuberculosis of upper rectum, verrucous, ii, 150
 symptoms, ii, 157
 predilection of, for large intestine, reasons for, iii, 44
 pulmonary and anorectal, and fistula in ano, relationship between, i, 393
 rectal, ii, 75
 sacrococcygeal, i, 172
 ulcerative rectal, ii, 146, 156
 verrucosa, anorectal, ii, 75, 79
- Tubes, enema, iii, 64
 Kelly's, i, 76, 79
- Tubular cancer, ii, 307
- Tumors, abdominal, diagnostic significance of, ii, 458
 benign, of anorectal region, ii, 238. See also *Anorectal region, non-malignant growths of*.
 inflammatory, of anorectal region, ii, 257
 of colon and sigmoid flexure, iii, 322
 neoplastic tubercular, of anorectal region, ii, 258
 of coccygeal body, i, 176
 parasitic, of anorectal region, ii, 260
 sacrococcygeal, i, 167, 168. See also *Sacrococcygeal tumors*.
 villous, as cause of anorectal hemorrhage, ii, 6
 of anorectal region, ii, 248
- Tuttle's differentiation between recto-urethral and rectovesical fistula, i, 383
 operation for procidentia sigmoidæ, ii, 56
 in recto-urethral fistula, i, 385
 proctoscope, i, 76, 78
 solution for injection treatment of internal hemorrhoids, i, 488
 table of operative mortality in radical operations and excisions, ii, 354
- Two-way irrigating proctoscope, Gant's, iii, 10
- Typanites, ii, 448
 and flatulence in diagnosis of anorectal diseases, i, 51
 diagnostic significance of, ii, 457
 following anorectal wounds, i, 197
 in malignant disease of anorectal region, ii, 321
- Typhlitis, ii, 515
- Typhlotonia, iii, 224
- Typhoid fever, diarrhea in, iii, 109
- Typhus bovinus, iii, 43
 fever, iii, 115
- ULCERATION, anorectal, ii, 58. See also *Anorectal ulceration*.
 following hemorrhoid operation, i, 542
 of rectum causing anorectal hemorrhage, ii, 4
 secondary, in syphilis, ii, 188
- Ulcerative bacillary colitis, iii, 3
 deep, tuberculosis of intestines, iii, 48
 diagnosis, iii, 60
 symptoms, iii, 56
- elephantiasis, perianal lupus and, differential diagnosis, ii, 170
- rectal tuberculosis, ii, 156
- superficial, tuberculosis of intestines, iii, 47
 diagnosis, iii, 60
 symptoms, iii, 56
- tuberculosis of upper rectum, ii, 146
- Ulcers, amebic, of sigmoid flexure and colon, ii, 536
 anorectal, in childhood, iii, 446
 as cause of sphincteralgia, i, 222
 fissure in ano and, differential diagnosis, i, 238
 girdle, iii, 48
 of colon, amebic, ii, 531
 painful, i, 227. See also *Fissure in ano*.
 perianal tubercular, ii, 79
 surrounding artificial anus, treatment, iii, 417
 syphilitic, 192
 diagnosis, ii, 193
 of anorectal region, ii, 88
 symptoms, ii, 193
 treatment, ii, 193
 venereal, anal fissure and, differentiation, i, 240
- Umbilical hernia, congenital, i, 2
 vesicle, i, 1
- Uncinariasis, iii, 23
 diagnosis, iii, 24
 prognosis, iii, 24
 symptoms, iii, 24
 treatment, iii, 24
- Uneasiness and fullness, abdominal sensations of, diagnostic significance of, ii, 457
- Unilateral intestinal exclusion, iii, 429
- Unnatural intercourse, ii, 201
- Upper rectum, diverticulum of, simulating an old abscess cavity, ii, 291
 treatment, ii, 291
- Upright position for examination of patient, ii, 325

- Urea hydrochlorid and quinin as local anesthetic, i, 116
- Urethra, rectum opening into, in imperforate anus, i, 147, 148
- Urinary calculi, ii, 500
- changes, diagnostic significance of, ii, 459
- incontinence following anorectal wounds, i, 197
- schistosomiasis, symptoms, iii, 36
- Urine, acetone in, i, 64
- acid, i, 64
- diacetic acid in, i, 64
- examination of, in diagnosis, i, 55, 64
- indican in, i, 64
- retention of, following fistula operation, i, 371
- postoperative, i, 539
- Urogenital sinus, i, 6, 7
- in female fetus, i, 6
- in male fetus, i, 6
- separation of rectum from, during development of human fetus, i, 7
- Urorectal fold, i, 7
- Uterus, prolapse of, complicating procidentia ani, recti, and sigmoidæ, ii, 31
- recti, ventral fixation of uterus or interposition operation in, ii, 52
- rectum opening into, in imperforate anus, i, 148
- VACCINE and serum treatment in bacillary colitis, iii, 9
- in focal infection of colon, sigmoid flexure, and rectum, iii, 121
- therapy in coccogenous pruritus ani, ii, 126
- Vagina, adenomyoma of, ii, 246
- rectum opening into, in imperforate anus, i, 144
- Vaginal colostomy, Gant's, iii, 419
- technic, iii, 420
- excision, history and evolution of, ii, 343
- in malignant growths of anorectal region, ii, 343
- mortality of, ii, 355
- proctectomy in malignant growths of anorectal region, ii, 408
- Gant's technic, ii, 409
- Valve, Bauhin's, ii, 429
- clamp, Gant's, ii, 270, 273
- proctotomy, Gant's, in anorectal stricture, ii, 234
- enterocecal, ii, 430
- ileocecal, ii, 429
- Valve, ileocecal, purpose of, ii, 430
- Valves, Houston's, i, 20
- of rectum, i, 13, 20
- hypertrophied, as cause of chronic rectal obstipation, iii, 244
- in childhood, iii, 454
- number, i, 20
- position of, structure of, i, 21
- semilunar, of rectum, i, 18
- function of, i, 18
- Valvotomy, Gant's clamp, iii, 290
- instruments, Gant's, iii, 289
- Valvulæ conniventes of small intestine, ii, 426
- Valvular stricture, anorectal, ii, 217
- Varicose anorectal ulceration, ii, 62
- treatment, ii, 63
- Veins of anorectal region, i, 27
- Venereal anorectal stricture, ii, 214
- diseases, manifestations of, in anorectal diseases, i, 94
- of colon and sigmoid flexure, iii, 74
- of rectum, anus, and perianal regions, ii, 179
- ulceration, anorectal, ii, 88
- ulcers, anal fissure and, differentiation, i, 240
- warts, diagnosis, ii, 199
- in childhood, iii, 454
- symptoms, ii, 198
- treatment, operative, ii, 200
- Ventral fixation of uterus, or interposition operation, in prolapsus uteri complicating procidentia recti, ii, 52
- Vermicular intestinal movements, diagnostic significance of, ii, 457
- Vermiform appendix, anatomy of, ii, 430
- Vermifuges, iii, 22
- Verneuil's operation for procidentia sigmoidæ, ii, 56
- Verrucæ, perianal, nonsyphilitic, ii, 197
- Verrucose anorectal ulceration, ii, 168
- Verrucous tuberculosis of perianal skin, ii, 157
- of upper rectum, ii, 150
- Vesicle, umbilical, i, 1
- Vibration in atonic constipation, iii, 204
- Vibratodes, types of, iii, 207
- Vibratasseur in atonic constipation, iii, 204
- Vibrator and vibratodes, Chattanooga, iii, 205
- Sheldon portable, iii, 206
- Vibrio cholerae asiaticæ, iii, 112
- Villi of intestines, development of, i, 8
- Villous adenoma, iii, 322
- of anorectal region, ii, 248

- Villous tumors as cause of anorectal hemorrhage, ii, 6
 of anorectal region, ii, 248
- Visceroptosis as cause of chronic obstipation, iii, 223
- Vitelline duct, i, 1
- Vitello, i, 2
- Vitiligo of anus, ii, 136, 137
- Vogel's modification of Krönlein's statistics on operability and mortality of Kraske's operation, ii, 355
- Volvulus, i, 5
 as cause of chronic obstipation, iii, 230
- Vomiting and nausea, diagnostic significance of, ii, 460
 in diagnosis, i, 54
- V-shaped incision operation for anal fissure, i, 254
- WALES' bougie and gauze handkerchief for arresting anorectal hemorrhage, ii, 15, 16
 method of introducing, ii, 226
 soft-rubber bougie, ii, 225
- Warts, syphilitic, ii, 188
 tuberculous, of anorectal region, ii, 79
 venereal, ii, 199. See also *Venereal warts*.
- Wassermann test in diagnosis, i, 69
- Water, drinking, and cold beverages, diarrhea from, iii, 100
 in constipation, iii, 196
 sterile, and normal salt solution as local anesthetic, i, 116
- Water-tight tractor bag, Gant's, ii, 402
- Waves, antiperistaltic, of large intestine, ii, 445
 peristaltic, of small intestine, ii, 444
- Weight and fulness in rectum in malignant disease of anorectal region, ii, 320
 loss in, diagnostic significance of, ii, 460
 in diagnosis of anorectal diseases, i, 52
- Weir, Maunsell, and Steintal's method of handling bowel ends when sphincter is preserved, ii, 380
- Whip-stitch sutures, iii, 359
- Whip-worm infection, iii, 33
- White line, Hilton's, i, 7
- Whitehead's circular excision operation for internal hemorrhoids, i, 519
 operation causing fecal incontinence, i, 406, 407
 for internal hemorrhoids, frequent and rare complications, i, 522
- Whitehead's operation for internal hemorrhoids, objectionable features in technic, i, 522
 temporary and permanent sequelæ, i, 523
- Why fistula operations are unsuccessful, i, 338
- Willem's method in fecal incontinence operation, i, 414
 technic of rectal extirpation, ii, 345
- William's table of relative frequency of malignant disease in rectum and other organs, ii, 293
- Winter cholera, iii, 113
- Wire operation, Gant's, in procidentia recti, ii, 46
- Wooden gorget, i, 356
- Worms, lumbricoid, round, iii, 25
- Wounds and injuries of abdomen, small intestine, colon, and sigmoid flexure, ii, 463.
 See also *Wounds of abdominal viscera*.
 anorectal, i, 191. See also *Anorectal wounds and injuries*.
 of abdominal viscera, contusions, ii, 463
 diagnosis, ii, 467
 illustrative cases, ii, 472
 penetrating puncture, ii, 465
 pneumatic, ii, 464
 postoperative treatment, ii, 470
 prognosis, ii, 470
 summary of Gant's cases, ii, 471
 surgical treatment of intestinal wounds, ii, 469
 symptoms, ii, 466
 treatment, ii, 468
 pneumatic, of abdominal viscera, ii, 464
- x-RAY examination in malignant growths of anorectal region, ii, 327
 in diagnosis, i, 65
 in treatment of malignant growths of anorectal region, ii, 338
- YOLK sac, i, 1
 stalk, i, 2
- Yellow fever, diarrhea in, iii, 111
- Young's dilators, i, 82, 225
- Yount's solution for injection treatment of internal hemorrhoids, i, 488
- ZANDER horse in atonic constipation, iii, 204, 209
- Zone, danger, of rectum, ii, 365, 366





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